TO STUDY POSTOPERATIVE COMPLICATIONS FOLLOWING ILEOSTOMY

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Submitted By

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I hereby declare that the thesis entitled "**TO STUDY POSTOPERATIVE COMPLICATIONS FOLLOWING ILEOSTOMY**" submitted towards partial fulfillment of the requirements for the award of **MS in General Surgery** degree to BFUHS is a compilation of original work carried out by me under the supervision of **Dr Amandeep Singh Nar**, Associate Professor, Department of General Surgery, **Dr. Atul Mishra**, Professor, Department of General Surgery. No part of this thesis has formed the basis for the award of any degree previously.

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Dedicated

to

my Family

&

Teachers

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Dr Prateek Janagal

ABBREVIATIONS

ET:	Enterostomal therapist
QOL:	Quality of life
BMI:	Body mass index
SBO:	Small bowel obstruction
IBD:	Inflammatory bowel disease
TIPS:	Transjugular intrahepatic portosystemic shunt
TB:	Tuberculosis
DM:	Diabetes Mellitus
HTN:	Hypertension
CAD:	Coronary artery disease

ABSTRACT

Introduction: A stoma is a surgically created opening that connects a part of the body cavity (intestine or urinary system) to the outside. Small bowel stomas (ileostomies) are commonly created now a days for various abdominal pathologies but this is unfortunately associated with a high incidence of morbidity.

Aim: To study postoperative complications following ileostomy.

Materials and Methods: This prospective observational study was conducted on patients presenting to Dayanand medical college and hospital, Ludhiana who underwent ileostomy and experienced ileostomy related complications during the period of January 2020 to June 2021. A total 67 patients were included in the study.

Results: The most common patients requiring ileostomy were the patients with perforation peritonitis secondary to enteric perforation and the commonest were the middle-aged group and the most common complication observed was Skin excoriation.

Conclusion: The construction of intestinal stoma (ileostomy) accompanies many complications ranging from minor which can be managed conservatively to major which may require exploration. Most common complication observed was skin excoriation and efforts should be made to reduce its occurrence. It's a collaborative effort of the surgeon, enterostomal therapist and patient itself to reduce the morbidity.

Keywords: Stoma, complications, ileostomy, skin excoriation

TABLE OF CONTENTS

S. NO.	TOPIC	PAGES
I	INTRODUCTION	1-2
II	AIMS AND OBJECTIVES	3
III	REVIEW OF LITERATURE	4-13
IV	MATERIALS AND METHODS	14-16
V	OBSERVATIONS AND RESULTS	17-28
VI	DISCUSSION	29-33
VII	SUMMARY AND CONCLUSIONS	34-36
VIII	BIBLIOGRAPHY	37-42
	APPENDICES – I - PROFORMA - MASTER CHART	
	APPENDICES – II - APPROVAL LETTER OF THESIS PLAN - THESIS PLAN	

LIST OF TABLES

Table No.	Title	Page No.
1.	Age distribution	17
2.	Gender distribution	18
3.	BMI of the patient	19
4.	Co-morbidities	20
5.	Primary etiology	21
6.	Type of procedure	22
7.	Type of anesthesia	23
8.	Type of ileostomy	24
9.	Complications during the hospital stay	25
10.	Complications on follow up after one month	26
11.	Complications on follow up after two months	27
12.	Preoperative investigations	28

LIST OF FIGURES

Fig. No.	Title	Page No.
1.	Age distribution	17
2.	Gender distribution	18
3.	BMI of the patient	19
4.	Co-morbidities	20
5.	Primary etiology	21
6.	Type of procedure	22
7.	Type of anesthesia	23
8.	Type of ileostomy	24
9.	Complications during the hospital stay	25
10.	Complications on follow up after one month	26
11.	Complications on follow up after two months	27

LIST OF PICTURES

Pic. No.	Title
1	SKIN EXCORIATION WITH RETRACTED STOMA
2	SKIN EXCORIATION
3	STOMA PROLAPSE WITH PARASTOMAL HERNIA
4	STOMA PROLAPSE
5	RETRACTED STOMA

INTRODUCTION

A stoma is a surgically created opening that connects a part of the body cavity (intestine or urinary system) to the outside. The word 'stoma' comes from the Greek word which means mouth. Fecal diversion is still a viable treatment option for a variety of gastrointestinal and abdominal problems[1].

Small bowel stomas (ileostomies) are commonly created as an emergency procedure in patients with bowel perforation, where performing an anastomosis carries a risk of leak; or in patients with bowel obstruction, where there may be a need to protect downstream anastomosis; or as an elective procedure such as in inflammatory bowel disease, familial adenomatous polyposis, radiation enteritis, fecal incontinence, malignancy etc.

Ileostomy placement can be permanent or temporary. A number of factors are considered when decision is to be made about whether to go straight for primary perforation repair or to go for repair of perforation with proximal stoma formation. These factors include the patient's age, general health, the period between beginning of symptoms and surgery, peritoneal cavity contamination, the number of perforations, unhealthy bowel etc. When primary bowel restoration carries a risk of anastomotic leak or the development of a fecal fistula, an ileostomy is performed to lower complication rates and allow the patient to get through the acute crisis.

Stoma formation is unfortunately associated with a high incidence of morbidity. When performed appropriately, a patient's quality of life can be improved significantly. Patients with a well-functioning ileostomy are expected to live a normal life with hardly any limits to their lifestyle. When a patient's stoma causes difficulties, the effects on his or her physical and emotional health can be irreversible. The associated morbidity and overall function of an ileostomy are determined by various factors like the ileostomy indication, whether it was made electively or as an emergency

procedure; patient characteristics such as BMI and associated comorbidities.

The rate of stoma-related complications ranges from 20% to 70%[2-5]. Early complications occur within 30 days of the stoma creation which includes ischemia/necrosis, retraction, mucocutaneous separation, excoriation, dehydration and electrolyte imbalance in patients with high output stoma. Late complications includes parastomal hernia, prolapse etc.

The consequences of these complications can range from minor inconvenience to life-threatening situations. It is the collaborative approach that is most important, involving doctors, stoma therapists and patient education all playing vital roles. Even with the best approach, a few difficulties are unavoidable which manifest themselves as early and late complications.

Stoma problems can have a considerable impact on a patient's quality of life and sense of well-being while also putting a strain on the health-care system. The surgeon must have a thorough awareness of stoma problems and how to treat them. Detail-oriented attention during stoma formation, especially for permanent stomas, can help decrease the morbidity associated with this procedure.

Despite the large number of ileostomies performed worldwide, there is a dearth of data on their complications in the literature. Keeping this in mind, the current study is being designed with the goal of prospectively recording the complications associated with ileostomy formation and determining which ones are the most common.

AIMS AND OBJECTIVES

To study postoperative complications following ileostomy.

REVIEW OF LITERATURE

History of stoma

Stoma has been written in the Bible. When Ethud stabbed Eglon, "he (Eglon) couldn't draw the dagger out of his belly, and dirt came out." Praxagoras of Kos had a type of stoma caused by intestinal injuries in 350 BC. Hippocrates (460-377BC), Cornelius (53BC-AD7), Galen (131-201AD) knew injuries to the colon and small intestine were often fatal, but did not know what to do.

Stoma Surgery Prior to 19th Century:

55BC-7AD	Celsus	Observations of damage to intestine
1707	Heister	First recorded stoma surgery
1756	Cheselden	Transverse colostomy
1795	Daguesceau	Fashioned colostomy
1799	Larrey	Intestine stitched to abdominal wound

According to the earliest references, damage to the large intestine may offer a thin hope of recovering. Celsus (55BC-7AD) wrote: "Sometimes the abdomen is penetrated by some sort of stab, and the intestines roll out." Nothing can be done if the small intestine has been penetrated.

Heavy weapons were seen started using in wars in the 14th century, and patients with gunshot wounds to the abdomen were mostly lost. George Deppe, a soldier, was injured in the back during the Battle of Ramillies on May 23, 1706. He was injured in the lower back, and as a result, he developed what is now known as a fistula. He lived with it for 14 years. Lorenz Heister (1683-1758) described stomas for trauma for the first time in the 17s. "As the wounded lips of the intestines would sometimes quite unexpectedly adhere to the wound of the abdomen," Heister wrote, "there seemed no reason why we should not take hints from nature." "It is unquestionably preferable to give up one of life's conveniences than to

give up life itself" (Lorenz Heister). On the Napoleonic battlefields, Dominique Larrey developed his surgical skills and formed a system for dealing with casualties, providing both on-the-spot treatment and evacuation procedures. He described the treatment and recovery of a soldier with a gunshot wound to the abdomen. He stitched the injured intestine to the edge of the abdominal wound, which remained open until the intestine healed.

Stoma Surgery during 19th Century:

1815	Freer	First elective stoma surgery
1887	Allingham	Loop colostomy
1895	Paul/Miculicz	Temporary stoma

Duret was the first to perform colostomy surgery for anorectal malformations. The patient lived until the age of 45. Daguesceau was the first to describe a faeces collection device. He built a stoma for a farmer who was injured by a wheat cart. He died at the age of 81. George Freer performed the first elective surgery in the United Kingdom on a neonate in 1815, but the baby died three weeks later due to complications. In 1887, Williams Allinghan described his invention of a double lumen loop colostomy held in place by a glass rod[6]. Mikulicz-Radecki observed high leak rates in primary anastomosis of the bowel in contaminated wounds result in morbidity and mortality[7]. Mikulicz recommended that intestinal anastomosis should be performed in two stages rather than a single staged procedure. Resection with a double barrelled stoma formation followed by anastomosis two weeks later. In his first 100 patients, incidence of mortality reduced from 50% to 12.5%.Maydl of Vienna performed the first successful ileostomy in 1883. Finney was the first one to demonstrate flush loop ileostomy. The concept of a supportive rod was first introduced in 1888. The use of a supportive rod will prevent the stoma retraction back into the abdomen.

Stoma Surgery in 20th Century:

1913	Brown	Temporary ileostomy
1923	Hartmann	End colostomy
1943	Miller	Proctocolectomy and ileostomy
1950	Bricker	Ileal conduit
1952	Brooke	Eversion ileostomy
1969	Kock	Internal pouch
1978	Parks	Preserved anal sphincter
1980	Mitrofanoof	Internal reservoir for urine

Mayo first demonstrated the use of a right transverse colostomy in the treatment of diverticulitis in 1907, followed by reversal once the inflammation settled. Mayo, Rankin, and Braun described a three-staged procedure in the 1930s. The first stage involved transverse colostomy and drainage, the second involved sigmoid resection and anastomosis, and the 3rd and last stage involved colostomy closure. Brown described ten patients with ileostomy at lower part of laparotomy incision. He mentioned that a Stoma 2-3 inches away from the midline could be emptied without complications. Between 1909 and 1923, Henry Hartmann developed the "Hartmann procedure" for obstructing sigmoid cancer[8]. Baum demonstrated the first diverting ileostomy for colorectal cancer in 1879. It is a single procedure that involves the removal of the upper rectum and sigmoid colon, followed by the creation of a terminal colostomy. Miller combined the first two stages of Hartmann's procedure in 1943. Miller and his colleagues were the first to perform a

one-stage panproctocolectomy, which included the removal of the colon, rectum, and anal canal, and the creation of a permanent ileostomy from the terminal ileum. In 1942, Crile developed the mucosal grafted ileostomy to prevent ileostomy dysfunction. In 1958, Turnbull and Gill coined the term "Enterostomal therapist" [9]. Turnbull was the first person to open the Enterostomal therapy school in 1961. Henry Koenig invented the first reel pouch in 1944. Wilhelm Baum, a German Surgeon from Danzig, first recorded an ileostomy in 1879 in a patient with a malignant tumour; the patient died 9 weeks later. Maydi from Vienna reported a successful recovery after an ileostomy in 1883. Brooke made a significant annoucement in ileostomy[10]. He described "Management of Ileostomy and its Complications" in his 1952 article. Bryan Brooke described the most important step as "evaginate(evert) the ileal end at the time of ileostomy formation and suture the mucosa to the skin; and no complications have occurred as a result of this" (1952).

Further He also described an improved technique, which involved everting the end of the withdrawn ileum and suturing fixing it into place to form a pout[11]. Nils Kock published his technique for creating an internal pouch from the terminal ileum to act as a feces reservoir in 1969. Sir Alan Parks described his method for forming a reservoir from a length of terminal ileum in 1978. The ileum is formed into a J or W shape before being opened and formed into a pouch[12].

Morbidity

An ileostomy is now a common procedure performed for the treatment of both benign and malignant conditions. An ileostomy can be formed a as part of elective or emergency surgery. It can be permanent or temporary, an end, loop or double barreled. This is usually formed at the end of a complex and difficult surgery. The rate of complications following ileostomy formation are significant and great care must be taken to comply to sound surgical approach during this part of the procedure. Ileostomy complications can be minor, requiring only local care and enterostomal

therapist (ET), or they can be devastating, necessitating multiple re-surgeries and significant morbidity[13,14]. Not only are the health-related issues, but the psychological impact of the stoma on patient body image and quality of life (QOL) must also be considered. There are conflicting results in determining whether an ileostomy has a greater influence on the patient's QOL [15,16], but the mere presence of any stoma has a significant impact on the patient's lifestyle [17]. Postoperative stomal complications are relatively a common cause of morbidity. Age, gender, body mass index (BMI), nutritional status, emergency versus elective surgery, type of ileostomy, and disease for which ileostomy was formed are all risk factors that predispose a patient to develop stoma-related complications. Early complications include ischemia/necrosis, retraction, mucocutaneous separation, and parastomal abscess. Parastomal hernia, prolapse, retraction, and varices are examples of late complications. In a study of 345 ostomates, Harris et al discovered that the most common stoma-related complications were herniation, retraction, necrosis, infection, prolapse, stenosis, fistula, and small bowel obstruction (SBO)[17]. The authors also discovered that of all stoma configurations, loop ileostomy had the highest complication rates. Postoperative stomal necrosis was frequently associated with the formation of an emergency stoma. Nastro et al reported a major complication rate of around 46.4 percent in the recent literature with long-term follow-up; however, when minor parastomal skin problems are included, the rate increased to around 56 percent[18]. Minor parastomal skin issues frequently coexisted with major complications (33.9 percent). Short stoma length, body mass index > 30, emergency surgery, and lack of preoperative marking were all linked to an increased risk of complications. It is believed that colostomies had a higher rate of complications than ileostomies (31.7 percent vs. 18.3 percent) [19,20].

Some of the most common stoma related complications are:

Parastomal Hernias - Incisional hernias at ostomy sites are known as parastomal hernias. The incidence of parastomal hernia varies depending on the type and configuration of the stoma (around1.8–28.3 percent for end ileostomies , 0–6.2 percent for loop ileostomies , 4–48 percent for end colostomies, and 0–30.8 percent for loop colostomy) [21,22].

Stomal prolapse - Stomal prolapse is a full-thickness bowel protrusion that occurs in approximately 3% of ileostomies, 2% of colostomies, and 1% of urostomies[23]. Acute stomal prolapse is treated at the bedside with sugar and ice to reduce bowel wall edema, followed by elective repair if it recurs. Stomal prolapse surgery options includes reversal of a temporary stoma (if possible and feasible), resection, revision, or relocation. The prolapsed bowel segment, usually the distal (efferent) limb, is either returned to the abdominal cavity or matured as a mucus fistula[24-26].

Stoma necrosis- Stomal necrosis is a postoperative complication caused by insufficient blood supply to the bowel. Emergency surgeries, and obesity are the most frequently associated with stomal necrosis[27].

Parastomal varices- In patients with portal hypertension with portosystemic collateralization, parastomal varices form (peristomal skin). The most common cause of stomal varices is inflammatory bowel disease (IBD) with concomitant primary sclerosing cholangitis[28]. Transjugular intrahepatic portosystemic shunt (TIPS) or liver transplantation are the most effective ways to reduce portal pressures[28-30].

Retraction-If the lumen of the stoma is below the skin level, the ileostomy is said to be retracted. When the stoma reaches the fascia, it completely retracts. Ileostomy retraction was seen in approximately 2.7 to 23% of the cases [31-34]. Previous necrosis, bowel tension, and an abnormally large opening in the abdominal wall may all contribute to early retraction. Late retraction can be caused by abnormal scarring at the stoma site, an increase in abdominal wall thickness, and obesity.

Peristomal Skin Complications: Peristomal skin complications are common among the ileostomy patients; peristomal skin is the skin to which the ostomy wafer adheres. The majority of peristomal skin complications are caused by stoma effluent coming into contact with and remaining on the skin. Skin excoriation is one of the most common complication. In the reviewed literature, reported rates of peristomal infection range from 0.3 to 3.2 percent [33-35]. It is usually caused by intraoperative contamination of the abdominal wall and granulomas caused by nonabsorbable sutures (stitch sinus). It could also happen as a result of a leak or the formation of a fistula. A postoperative parastomal infection is more likely in an emergency setting. Other complications included pyoderma gangrenosum, stomal stenosis, dehydration / electrolyte imbalance, mucocutaneous separation etc.

Several studies have been conducted in recent years in order to identify the complications associated with ileostomy formation. Only a few studies dealing with complications after stoma creation were found in Indian literature[36-39]. The reported literature complication rate ranged from 5% to 100%, with minor complications requiring no surgical intervention and major complications requiring surgical intervention. Other authors have also reported higher rates of complications[40-43].

Park et al[34]did a retrospective analysis on 1616 patients from 1976 to 1995. 428 patients (26.5%) had undergone ileostomy, with 208 (48%) experiencing complications. Complications were considered both early (within 30 days of stoma formation) and late (after 30 days). Skin excoriation (12%) was the most common early stomal complication in 448 patients, caused by stoma neglect, leakage, improper fit, or frequent changing of stoma appliance. The next most common complication was pain caused by an improperly placed stoma (7%). Skin irritation (6%), prolapse (2%), and stenosis were the most common late complications observed (2%).

Arumugam et al[44] (2002)did a prospective study on 97 patients, with a one-year follow-up. 47 patients (50.5 percent) experienced one or more complications, with skin excoriation (28 patients) being the most common, followed by stoma retraction (23 patients). Other complications observed included parastomal hernia (12), prolapse (11), necrosis, ischemia, and sloughing.

Robertson et al[45] (2005)did a prospective study on 408 patients with either an ileostomy or a colostomy (52%), and stoma-related complications were assessed on post-operative day 10, then at 3 and 6 months, yearly, and every two years. On follow-up, the number of patients gradually decreased. The overall complication rate was only 23.5 percent. Skin excoriation (33%), nighttime leakage and soiling (22%), and the need for frequent nighttime emptying were the most common complications encountered in ileostomy patients (40%). During follow-up, the incidence of parastomal hernia, a late complication, increased from 0% to 22% among ileostomy patients but was only bothersome in 6%.

Persson et al[46](2009) conducted a study on 180 patients with a two-year follow-up at two weeks, three months, six months, twelve months, and twenty-four months after discharge. Most complications were observed two weeks after discharge, with skin problems being the most common, as documented in 37 of 58 ileostomates (64%).

Nastro et al[18](2010) assessed 1216 patients with a two-year minimum follow-up; ileostomy was performed on 569 of the 1216 patients (47%). The overall complication rate was 56%. Skin excoriation and slough were two of the ten complications recorded in 412 patients (34%). Other major complications seen included parastomal hernia in 171 patients (14%), bleeding in 156 (12.8%), obstruction in 116 (9.5%), and ischemia in 100(8.2%). Fistula, retraction, prolapse, and stenosis were seen in 72, 72, 66, and 52 patients, respectively.

Jonkers et al[47](2012) performed a prospective cohort study, 100 patients were evaluated. In a one-year follow-up, patients were evaluated for

complications eight times after discharge: at 1, 3, and 14 days, then at 4, 6 weeks, and 3, 6, and 12 months. The overall complication rate was 82 %, with skin excoriation (55 %), fixation issues (46 %), leakage (40 %), and high output stoma being the most common (25%). Superficial necrosis, bleeding, retraction, and parastomal hernia were found in 20%, 14%, 9%, and 6% of the patients, respectively.

Basu et al[36] (2014) 50 patients who had stoma formation underwent an observational prospective study. Ileostomy was performed on 43 patients, with ileal perforation being the most common cause. Skin excoriation (66%) was the most common complication observed, followed by transient edema (56%), ileostomy diarrhea (52%), mucocutaneous separation and retraction (26%), superficial bleeding (6%), and stomal ischemia (4%).

Rajkumar et al[37](2016) performed a prospective study on 100 patients who were operated on in an emergency operation theatre for exploratory laparotomy and stoma formation. The most common cause of stoma formation was intestinal perforation (63%). The most common subtype of ileostomy was loop ileostomy, which was formed in 82 patients. The overall complication rate was 85%, which included peristomal skin excoriation (80%), prolapse and retraction (27%) each, fixation problems (17%), stenosis (7%), parastomal hernia (7%), and stomal bleeding (6%).

Chaudhary et al[38](2015) did a prospective follow-up study on 630 patients who underwent exploratory laparotomy for perforation peritonitis with temporary ileostomy creation in an emergency. Enteric perforation (n=402) was the most common pathology, followed by tuberculosis (n=106) and trauma (n=81). Patients were examined on a daily basis for 7 days following surgery, then at the end of the second week, and then every two weeks until the eighth week. The occurrence, nature, and rate of complications were studied and recorded, yielding an overall complication rate of 52.5 %. There were no stoma-related complications in 299 patients, remaining patients developed complications with skin excoriation being the most common (n=127).

Choudhary et al[48](2018) performed prospective study on 50 patients who presented to the emergency room with a diagnosis of perforation peritonitis and underwent exploratory laparotomy with the formation of a stoma. Loop ileostomy was performed in 23 patients (46%), end ileostomy was performed in 21 patients (42%), and proximal loop ileostomy with distal primary repair was performed in 6 patients (12%). 22 patients (44%) had enteric perforation, while 18 (36%) had tubercular perforation. Skin excoriation was observed in 32 patients (64%), transient edema and ileostomy diarrhea in 26 patients (52%), mucocutaneous separation and retraction in 12 patients (24%), and ischemia in 1 patient (2%).

It is clear from the preceding discussion that stoma complications can have a significant impact on patients' quality of life and sense of well-being while also putting a strain on the health-care system. The possibility of serious complications necessitating reoperation or ongoing daily patient distress long after the initial procedure should not be underestimated. The study of the incidence and severity of ostomy complications, as well as the factors that contribute to the development of such complications, helps in establishing new scientific knowledge and lays the groundwork for the development of better procedures and methods for preventing such complications.

MATERIALS AND METHODS

Cases with Ileostomy related complications in the department of Surgery, Dayanand Medical College and Hospital, Ludhiana over a period of $1^{½}$years, was studied and analyzed statistically.

Source of Data

The study was conducted on patients with ileostomy admitted to the "Department of Surgery, DMC Hospital, Ludhiana" during the period of January 2020 – June 2021

Inclusion Criteria:

1. All Patients were checked for various complications post ileostomy formation during their hospital stay and at the follow ups till the stoma closure
2. Patient undergoing ileostomy as emergency or elective procedure in the department of surgery

Exclusion Criteria:

Patients with any other stoma other than ileostomy

Method of collection:

All patients presenting to Dayanand Medical College and Hospital requiring ileostomy as an emergency or an elective procedure were included from January 2020 to June 2021. Post ileostomy, these patients were observed for stoma related complications during the hospital stay and at follow up (after 1^{st} month and 2^{nd} month/ till the stoma closure whichever earlier). Records of all the patients were kept in the study proforma and photographs were taken.

Patients were observed for following stoma related complications:

Excoriation	Skin ulceration around the ileostomy site.
Prolapse	Protrusion of bowel causing stoma to increase in size after maturation
Fistula	Formation of any enterocutaneous communication along stoma
Stenosis	Narrowed lumen of the stoma on digital examination at fascial or skin level
Retraction	Stoma that is completely or partially beneath the skin's surface
Necrosis	Excess tension over the mesentery leading to stomal necrosis.
Parastomal hernia	Hernia at or around the stoma site.
Small bowel obstruction	Small bowel obstruction occurring around limbs of ileostomy
High output stoma	Stoma output of more than 2 liters per 24 hours
Flush stoma	Stoma which is at the level of skin surface
Bleeding	Bleeding from the stomal site

Hematological investigations:

1. Hemogram
2. Serum urea, creatinine
3. Serum electrolytes
4. Serum albumin

Radiological investigations:

1. Chest x-ray
2. Ileostogram (at the time of stoma closure)

OUTCOME

To study various complications encountered in patients undergoing ileostomy

STATISTICAL ANALYSIS

Data was described in terms of range; mean ±standard deviation (± SD), frequencies (number of cases) and relative frequencies (percentages) as appropriate. All statistical calculations were done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows

OBSERVATIONS AND RESULTS

A hospital based prospective observational study was conducted on 67 patients admitted to Dayanand Medical College and Hospital, Ludhiana, who underwent ileostomy and developed complications during the period of January 2020 to June 2021.

Demographic profile

1. Age distribution

In our study, most of the patients were in the age group of 31-50 years (43.3%), followed by patients with age <30 years (26.9%). 15 patients (22.4%) were in the age group of 51-70 years and least were in the age group of >70 years (7.5%).

Table 1: Age distribution

Age(in years)	No. of cases	Percentage
< 30	18	26.9%
31-50	29	43.3%
51-70	15	22.4%
> 70	5	7.5%
Total	67	100.0%

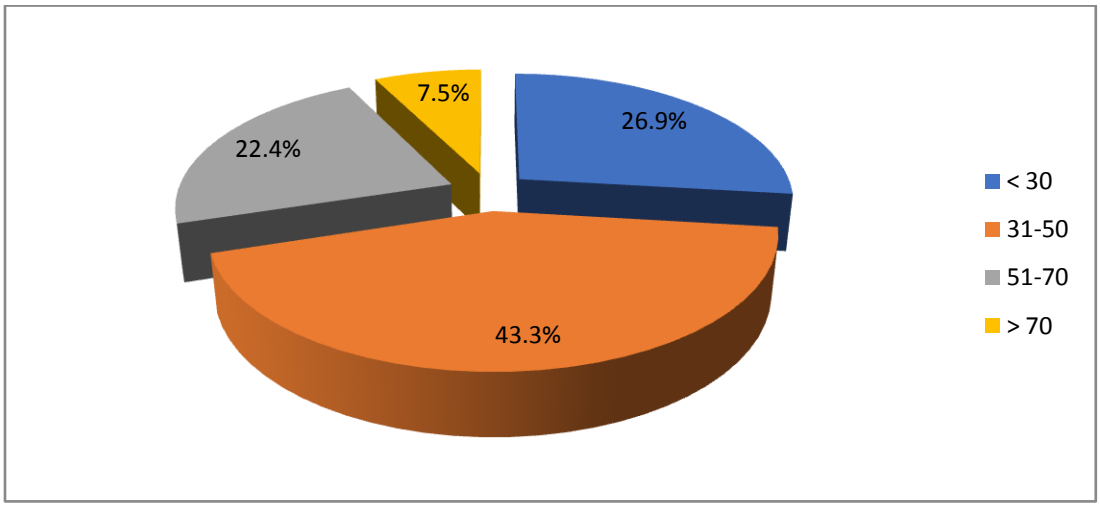

Figure 1: Age distribution

2. Gender distribution

There was male preponderance in the study with number of males being 47 (70.1%) and females 20 (29.9%).

Table 2: Gender distribution

Sex	No. of cases	Percentage
Female	20	29.9%
Male	47	70.1%
Total	67	100.0%

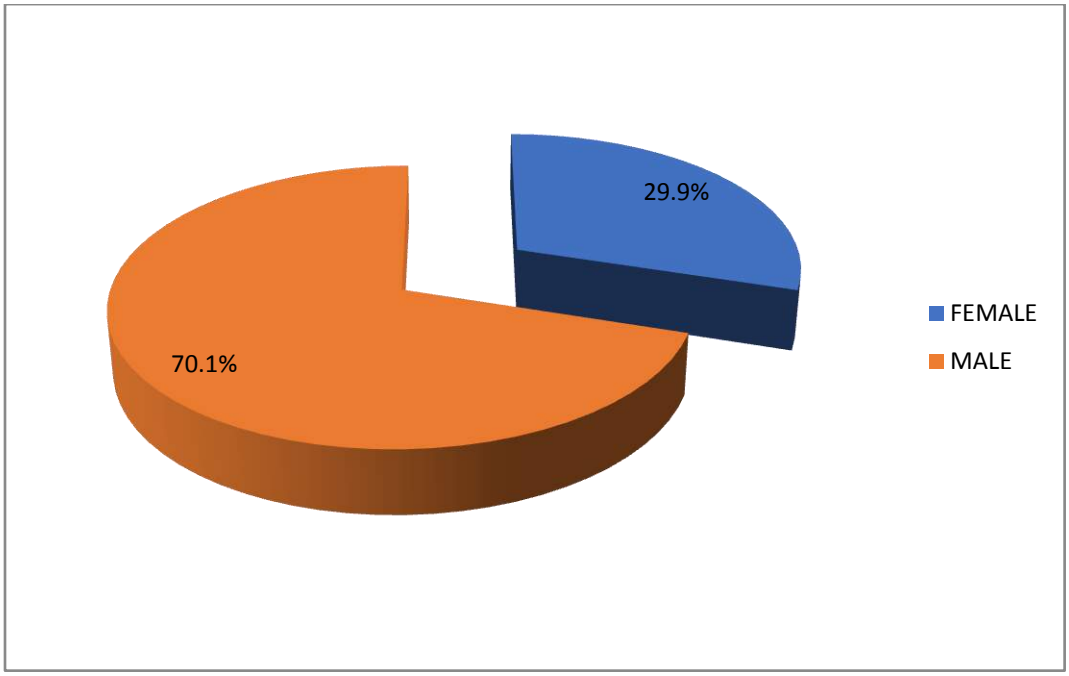

Figure 2: Gender distribution

3. BMI of the patient

In our study it was observed that 20 patients (29.9%) had normal body mass index. 8patients (11.9%)were underweighted (<18.5), 36 patients (53.7%%) were overweight (>24.99) and 3 patients (4.5%) were obese.

Table 3: BMI of the patient

BMI	No. of cases	Percentage
Underweight(<18.5)	8	11.9%
Normal weight(18.5-24.99)	20	29.9%
Overweight(25.0-29.9)	36	53.7%
Obese(>30.0)	3	4.5%
Total	67	100.0%

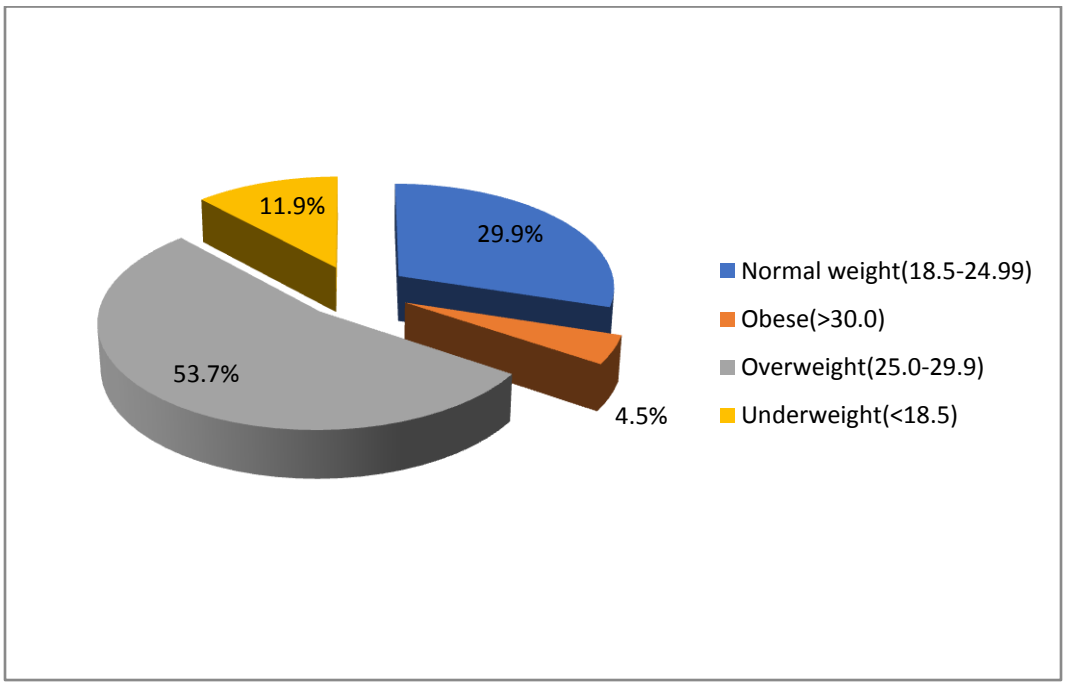

Figure 3: BMI of the patient

4. Co-morbidities

In our study,30 patients (44.8%) had no co-morbidities, while 17 patients (25.4%) had diabetes mellitus and hypertension was seen in 13 patients (19.4%). There were patients who were having more than one co-morbidity. 3 patients (4.5%) had diabetes with hypertension, 1 patient (1.5%) had diabetes with coronary artery disease and 3 patients (4.5%) had diabetes, hypertension and coronary artery disease.

Table 4: Co-morbidities

Co-morbidity	No. of patients	Percentage
None	30	44.8%
DM	17	25.4%
DM, HTN	3	4.5%
DM, HTN, CAD	3	4.5%
DM, CAD	1	1.5%
HTN	13	19.4%
Total	67	100.0%

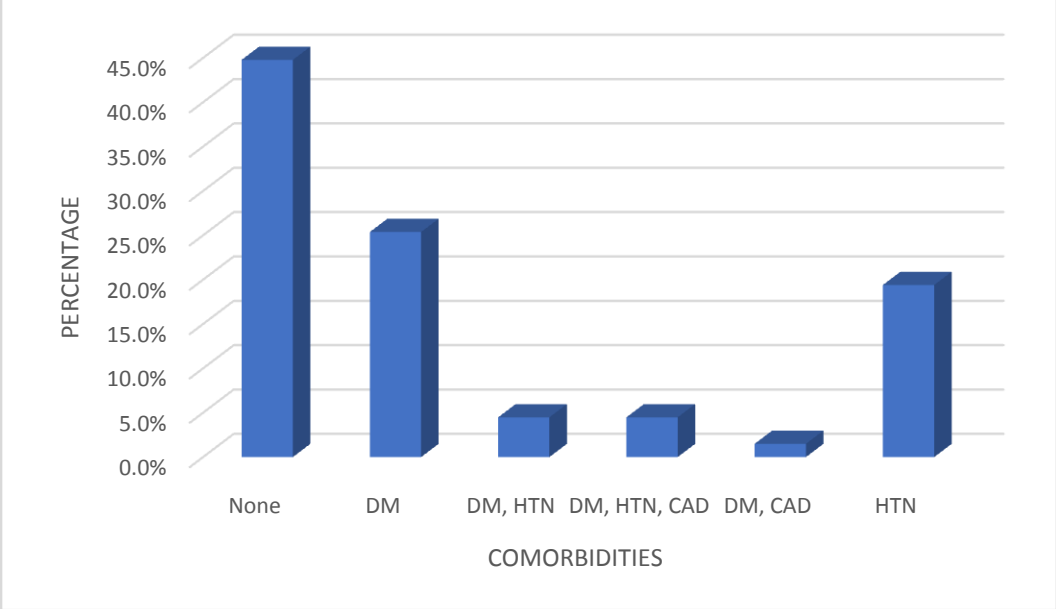

Figure 4: Co-morbidities

5. Primary etiology:

The most common primary etiology observed in our study that demanded surgical intervention and subsequently stoma formation wasenteric perforation which was seen in33 patients(49.3%) followed by abdominal tuberculosis in 14 patients (20.9%); Bowel obstruction secondary to adhesions(n=6, 9%),traumatic bowel perforation (n=6, 9%), carcinoma colon(n=4, 6%), acute complicated appendicitis(n=4, 6%) were other causes.

Table 5: Primary etiology

Primary etiology	No. of cases (n=67)	Percentage
Enteric perforation	33	49.3%
Abdominal tuberculosis	14	20.9%
Acute complicated appendicitis	4	6.0%
Carcinoma colon	4	6.0%
Bowel obstruction secondary to adhesions	6	9.0%
Trauma	6	9.0%
Total	67	100.0%

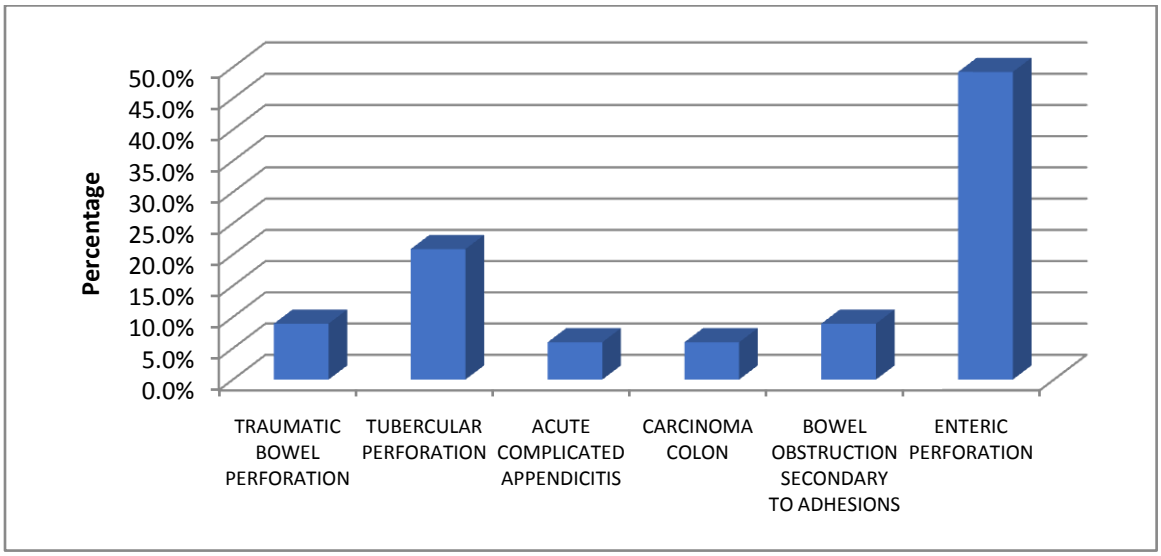

Figure 5: Primary etiology

6. Type of procedure:

Out of 67 patients, 58 patients(86.6%) underwent ileostomy as an emergency procedure whereas it was an elective procedure in 9 patients(13.4%).

Table 6: Type of procedure

Procedure	No. of cases	Percentage
Emergency	58	86.6%
Elective	9	13.4%
Total	67	100.0%

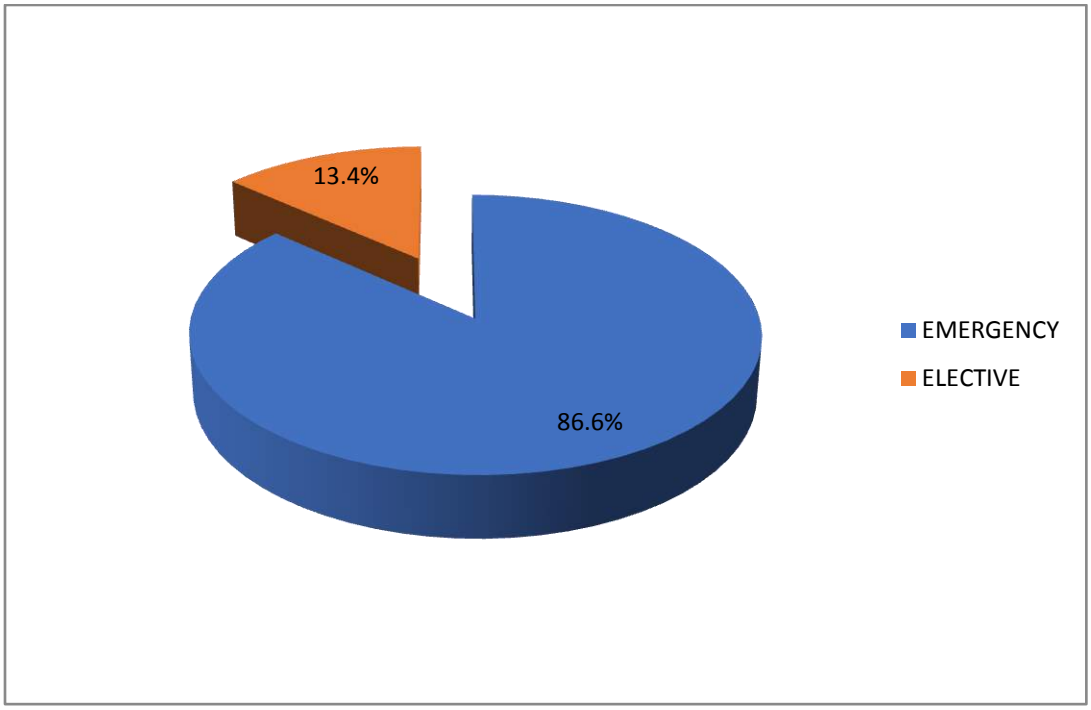

Figure 6: Type of procedure

7. Type of anesthesia

All the patients in our study underwent ileostomy formation under general anesthesia.

Table 7: Type of anesthesia

Anesthesia	No. of cases	Percentage
General anesthesia	67	100.0%
Spinal anesthesia	0	0.0%
Total	67	100.0%

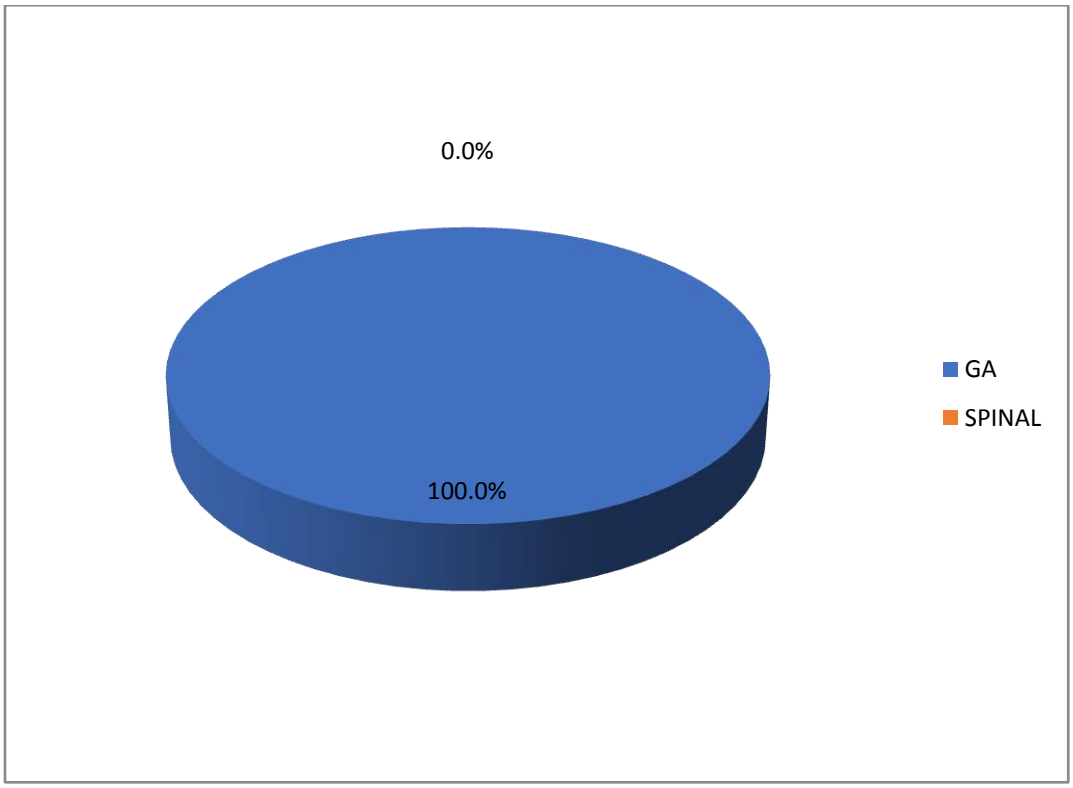

Figure 7: Type of anesthesia

8. Type of Ileostomy:

In our study, 59 patients (88.1%) underwent Loop ileostomy whereas end ileostomy was done in 5 patients (7.5%) and double barrel ileostomy was performed in 3 patients.

Table 8: Type of ileostomy

Type of ileostomy	No. of cases	Percentage
Loop ileostomy	59	88.1%
End ileostomy	5	7.5%
Double barrel ileostomy	3	4.5%
Total	67	100.0%

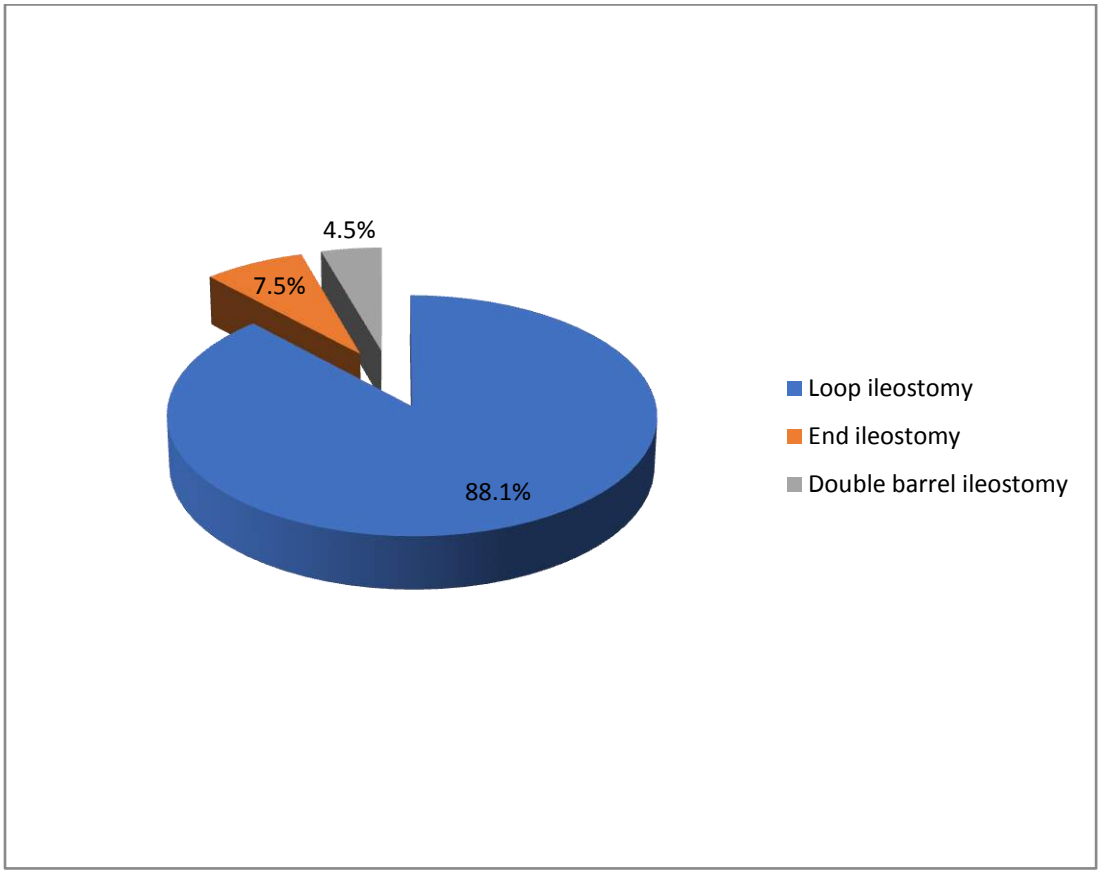

Figure 8: Type of ileostomy

9. Complications during the hospital stay

It was observed in our study that during the hospital stay 47 patients (70.1%) encountered no stomal complications whereas 9 patients (13.4%) experienced skin excoriation. High output stoma was seen in 10 patients (14.9%) and stoma stenosis in 1 patient (1.5%).

Table 9: Complications during the hospital stay

Complications during the hospital stay	No. of cases	Percentage
None	47	70.1%
Excoriation	9	13.4%
Stenosis	1	1.5%
High Output Stoma	10	14.9%
Total	67	100.0%

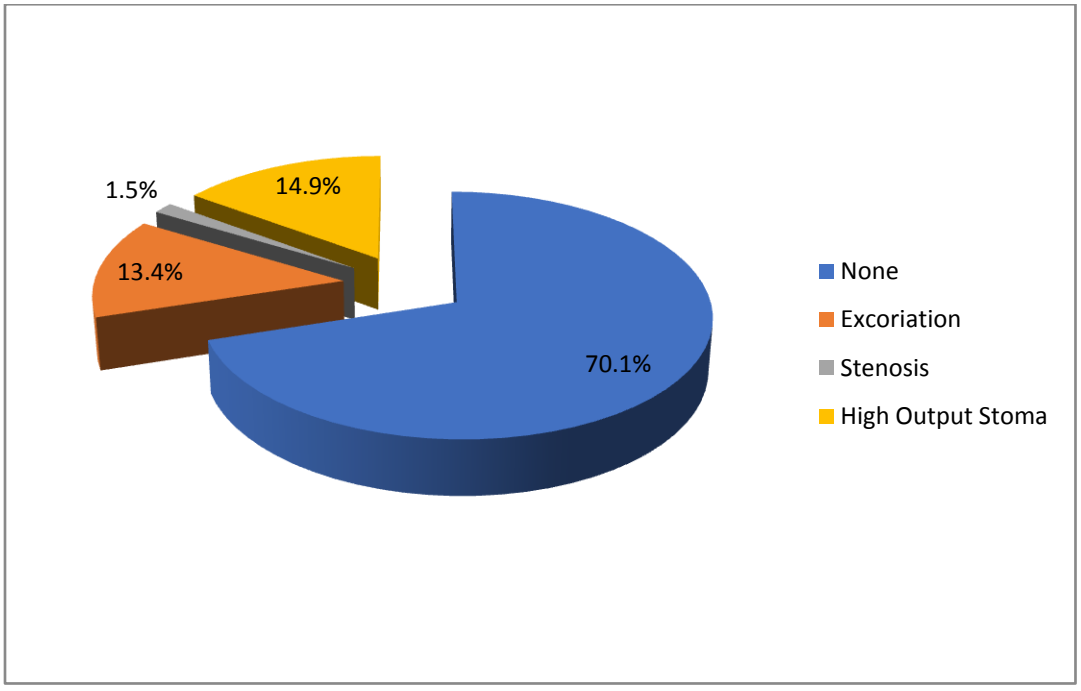

Figure 9: Complications during the hospital stay

10. Complications on follow up after one month

In our study, 15 patients (14.9%) experienced no stomal complications on follow up after one month, whereas skin excoriation was the most common complication observed in 48 patients (71.6%) followed by stomal prolapse in 8 patients (11.9%) and stomal retraction in 1 patient (1.5%).

Table 10: Complications on follow up after one month

Complications on follow up after 1 month	No. of cases	Percentage
None	15	14.9%
Excoriation	48	71.6%
Retracted	1	1.5%
Prolapse	8	11.9%
Total	67	100.0%

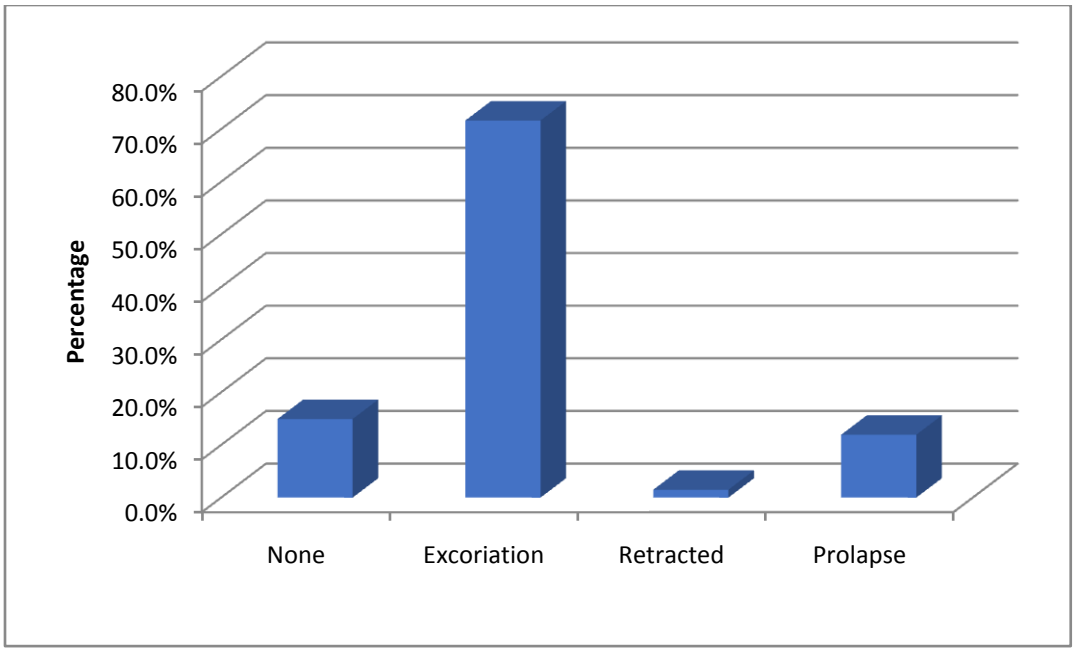

Figure 10: Complications on follow up after one month

11. Complications on follow up after two months

In our study, 10 patients (15.1%) had no complications on follow up after two months. Skin excoriation was the most common complication observed in 54 patients (81.9%); parastomal hernia (n=1, 1.5%) and excoriation with prolapse (n=1, 1.5%) were other stomal issues observed.

Table 11: Complications on follow up after two months

Complications	No. of cases (after 2 months)	Percentage
None	10	15.1%
Excoriation	54	81.9%
Excoriation, Prolapse	1	1.5%
Parastomal hernia	1	1.5%
Total	66	100.0%

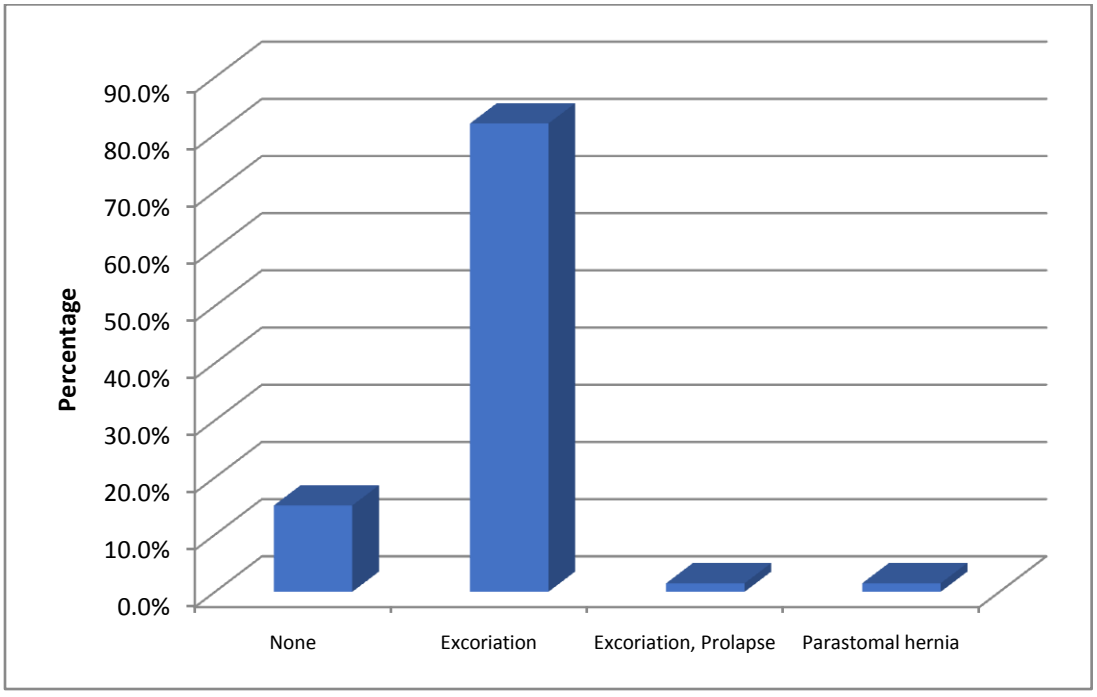

Figure 11: Complications on follow up after 2 months

12. Preoperative investigations:

Preoperatively all patients underwent routine investigations. Amongst the 67 patients, the hemoglobin levels ranged from 8.10 to 15.80 g/dl with mean Hb level of 11.53 g/dl. Total leucocyte counts were in the range of 5.0 x 10^3/ul to 24.20x 10^3/ul with mean TLC count of 11.32 x 10^3/ul; Platelet count ranged from 118to 457 x 10^3/ul with mean count of 229.67 x 10^3/ul. Creatinine levels were in the range of 0.40 to 1.57 mg/dl with mean level of 1.07 mg/dl; sodium levels were in the range of 130 to 148mmol/l with mean level of 137.59mmol/l; potassium levels were in the range of 3 to 4.92mmol/l with mean level of 3.91mmol/l; chloride levels ranged from 90 to 111mmol/l with mean level of 99.95mmol/l; albumin levels were in the range of 2.80 to 4.20 g/dl with mean level of 3.53 g/dl; bilirubin levels ranged from 0.26 to 1.70mg/dl with mean level of 1.09mg/dl.

Table 12: Preoperative investigations

N=67	Minimum	Maximum	Mean	Std. Deviation
Hemoglobin(g/dl)	8.10	15.80	11.53	1.60
Total leucocyte count(10^3/ul)	5.00	24.20	11.32	3.82
Platelets (10^3/ul)	118.00	457.00	229.67	84.02
Urea (mg/dl)	10.00	59.00	24.22	8.36
Creatinine (mg/dl)	0.40	1.57	1.07	0.22
Sodium (mmol/l)	130.00	148.00	137.59	3.59
Potassium (mmol/l)	3.00	4.92	3.91	0.36
Chloride (mmol/l)	90.00	111.00	99.95	5.26
S. Albumin (g/dl)	2.80	4.20	3.53	0.36
S. Bilirubin (mg/dl)	0.26	1.70	1.09	0.18

DISCUSSION

A prospective observational study was performed on 67 patients who underwent ileostomy formation from January 2020 to June 2021, in the department of Surgery, Dayanand Medical College and Hospital Ludhiana. Post ileostomy, these patients were observed for stoma related complications during the hospital stay and at follow up (after one month and two months/ till the stoma closure whichever earlier).

Demographics of the study

Age

In our study, most of the patients were in the age group of 31-50 years (43.3%). Chaudhary et al observed maximum number of patients in the age group of 31-40 years with mean age of 34 years[38]. Basu et al[36] (2014) in his study observed that majority of patients belonged to 31 to 45 years of age group with mean age of 38.06 years.

Gender

It was observed in our study that most of the patients were males (70.1%) with male: female ratio being 2.3:1.Chaudhary et al in his study observed 64% patients were males and 36% patients were females [38]. Saini et al in his study observed that 72.5% were males and 27.5% were females [39]. It is believed that surgical intervention in the form of laparotomy and subsequent stoma formation is more common in males as they are more involved in outdoor activities which make them more prone to gastro-intestinal infection and trauma.

Body Mass index (BMI)

It has been observed in our study that 20 patients (29.9%) had normal BMI. 8 patients (11.9%) were underweight (<18.5), 36 patients (53.7%) were overweight (>24.99) and 3 patients (4.5%) were obese. Difficult stoma mobilization due to thickened fat mesentery in obese patients and difficulty in stoma appliance fixation due to bony prominences in thin or

underweight patients may be the contributing factor to development of more stomal complications in underweight patients and patients with high BMI. Arumugam PJ et al[44] also observed high frequency of stomal complications in patients with high BMI.

Co-morbidities

In our study, 30 patients (44.8%) had no co-morbidities whereas 37 patients were suffering from various co-morbidities. Type 2 diabetes mellitus was present in 35.9% patients whereas 19 patients (28.3%) had hypertension and 4 patients (6%) had cardiac ailments. Rajkumar et al[37] observed hypertension and diabetes as common comorbid conditions in his patients while, Verma et al[49] observed cardiac ailments, diabetes and hypertension as common comorbidities among the patients included for his study.

Etiology

It has been observed in our study that the most common indication for surgical intervention with subsequent ileostomy formation was enteric perforation which was seen in33 patients (49.3%) followed by abdominal tuberculosis in 14 patients (20.9%).Acute complicated appendicitis (n=4, 6%), carcinoma colon (n=4, 6%), bowel obstruction secondary to adhesions (n=6, 9%) and trauma (n=6, 9%) were other causes observed. Study conducted by Chaudhary et al[38] also found enteric fever, abdominal tuberculosis and trauma as primary etiologies in 63.8 %, 17% and 12.8% patients respectively.

Type of procedure

In our study, 58 patients (86.6%) had ileostomy as an emergency procedure while only 9 had it as a planned procedure (13.4 %). Zidda M et al [50] and Sushil Mittal et al[51] also observed that in developing countries, such as ours, ileostomy was frequently performed as an emergency procedure.

Type of ileostomy

In our study loop ileostomy (n=59, 88.1%) was more frequent as compared to double barrel (n=3, 4.5%) and end ileostomy (n=5, 7.5%).It was seen that rate of loop ileostomy was more in patients with enteric perforation. This can be explained by the fact that as in developing countries like ours, the presentation to hospital is usually late with fully blown peritonitis and septicemia. In such cases, primary repair of perforation carries high risk of morbidity and mortality thus leading to more ostomy formation. Tariq Farooq et al observed in his study that, exteriorization of perforation as loop in cases of enteric ileal perforation yielded the best result in decreasing the rate of morbidity and mortality[52].whereas patients with an unhealthy portion of the gut or multiple perforations, were more likely to have a double barrel/end ileostomy. Persson et al in his study also observed 66% patients underwent loop ileostomy and 34% had end ileostomy [46].

Preoperative investigations

In this study, mean hemoglobin observed was 11.53g/dl with range of 8.1-15.8g/dl. Mean total leucocyte count was 11.32/ul with range of 5-24.2x 10^{x3}/ul and mean blood urea was 24.22mg/dl with range of 10-59mg/dl. Mean creatinine levels were 1.07mg/dl with range of 0.4-1.57mg/dl. Low hemoglobin may be due poor nutritional status, sepsis and high values maybe due to hemoconcentration secondary to dehydration. Dehydration and sepsis also account for deranged renal function tests. Verma et al observed that 51.2% had total leucocyte count more than 11 x 10^{x3}/ul and preoperative renal function tests were deranged in majority of patients with bowel perforation [49].

Complications

Skin excoriation was the most frequent complication observed in our study which was seen in 9 patients (13.4%) during the hospital stay, 48 patients (71.6%) after one month and 49 patients (74.2%) after two months of

follow up. Study conducted by Persson E et al[46]also showed similar results with an incidence of 73% in his patients. The probable cause maybe improper stoma care and high or low body mass index. Obese patients usually have thickened mesentery and intraoperatively stoma mobilization becomes difficult and traction is present over bowel leading to more chance of stoma retraction and peristomal skin problems whereas in thin patients, due to bony prominences stoma appliance fixation becomes difficult leading to high incidence of fecal spillage and hence the peristomal skin complications. It was observed that the incidence of this stomal issue was lower in patients during the hospital stay. This may be due to the fact that our institute had enterostomal therapist who plays important role in stoma care and patient education.

Another common complication observed was High output stoma. In our study this complication was observed in 10 patients (14.9%) during the hospital stay. Study conducted by Saini et alin [39] and Jonkers et al[47] showed incidence of this complication in 22.5% and 25% patients respectively. Usual causes leading to this complication includes bowel edema, insufficient small bowel length, intra-abdominal sepsis etc. High output stoma often causes leakage of stoma bag which ultimately leads to peristomal skin problems such as excoriation. Even after the discharge, patients are assumed at risk for high output stoma, therefore patients should be made aware of the signs of high output stoma and risk of peristomal skin problems.

Stoma prolapse was another complication observed in our study with the incidence of 11.9%(n=8) after 1 month and 1.5%(n=1) after 2 months of follow up. Robertson et al [45] observed this incidence as 11% in his study. Stoma prolapse is usually a late complication and can be seen in both loop as well as end ileostomies. High incidence of this complication was seen in patients with loop ileostomy in our study. Singh KP et al also observed in his study that most of the patients with prolapsed stoma had loopileostomy.[53] Prolapse is rarely a surgical emergency as the stoma

function is preserved. This can be usually managed conservatively by gentle pressure over the stoma or sometimes may need the use of hypertonic solutions. However, in cases where patient fails to respond to the conservative treatment, closure and restoration of the bowel can be considered. In our study, most of the patients were managed conservatively and only 1 patient underwent early restoration of the bowel as he failed to respond to conservative treatment.

Stoma retraction is usually an early postoperative complication resulting from traction on the bowel due to inadequate mobilization at the time of surgery. Only one patient (1.5%) experienced this complication in our study. The overall incidence reported is about 3 to 17% in ileostomies as mentioned in the studies conducted by Londono Schimmer EE[54] and Carlsen E et al[31]. The low occurrence in our institute may be attributed to the use of a stoma rod, and adequate mobilization of bowel loop at the time of stoma formation.

Parastomal hernia is often a late complication. The frequency of hernia was lower in our study and only 1 patient developed this problem. Krishnamurty et al[55] observed in his study that the incidence varied from 1.8 to 28.3% for end ileostomies and 0 to 6.2% for loop ileostomies. In the study conducted by Persson et al[46] only 1 patient developed this complication that too after 6 months. The low incidence of parastomal hernia in our study may be related to the short follow-up period.

Stoma Stenosis was observed in only 1 patient(1.5%) in our study which was managed conservatively. Parmar et al[56] reported the incidence of this complication in 2% patients. It usually occurs as a result of technical error when either the skin or the fascia is left too tight at the time of surgery. This may even lead to necrosis of the stoma due to compromised blood supply, thus requiring re-exploration.

SUMMARY AND CONCLUSION

A hospital based prospective observational study was conducted on 67 patients presenting to Dayanand Medical College and Hospital, Ludhiana who underwent ileostomy during the period of January 2020 to June 2021 after approval from Institutional ethics committee.

The following observations were observed:

1. In our study, most of the patients were in the age group of 31-50 years (43.3%), followed by patients with age <30 years (26.9%). 15 patients (22.4%) were in the age group of 51-70 years and least were in the age group of >70 years (7.5%).
2. There was male preponderance in the study with number of males being 47 (70.1%) and females 20 (29.9%).
3. In our study it was observed that 20 patients (29.9%) had normal body mass index. 8 patients (11.9%) were underweighted (<18.5), 36 patients (53.7%%) were overweight (>24.99) and 3 patients (4.5%) were obese.
4. In our study, 30 patients (44.8%) had no comorbidities, while 17 patients (25.4%) had diabetes mellitus and hypertension was seen in 13 patients (19.4%). There were patients who were having more than one comorbidity. 3 patients (4.5%) had diabetes with hypertension, 1 patient (1.5%) had diabetes with coronary artery disease and 3 patients (4.5%) had diabetes, hypertension and coronary artery disease.
5. The most common primary etiology observed in our study that demanded surgical intervention and subsequently stoma formation was enteric perforation which was seen in 33 patients (49.3%) followed by abdominal tuberculosis in 14 patients (20.9%); Bowel obstruction secondary to adhesions(n=6, 9%),traumatic bowel perforation (n=6, 9%), carcinoma colon(n=4, 6%), acute complicated appendicitis(n=4, 6%) were other causes.

6. Out of 67 patients, 58 patients (86.6%) underwent ileostomy as an emergency procedure whereas it was an elective procedure in 9 patients (13.4%).
7. All the patients in our study underwent ileostomy formation under general anesthesia.
8. In our study, 59 patients (88.1%) underwent Loop ileostomy whereas end ileostomy was done in 5 patients (7.5%) and double barrel ileostomy was done in 3 patients.
9. It was observed in our study that during the hospital stay 47 patients (70.1%) encountered no stomal complications whereas 9 patients (13.4%) experienced skin excoriation. High output stoma was seen in 10 patients (14.9%) and stoma stenosis in 1 patient (1.5%).
10. In our study, 15 patients (14.9%) experienced no stomal complications whereas skin excoriation was most common complication observed in 48 patients (71.6%) followed by stomal prolapse in 8 patients (11.9%) and stomal retraction in 1 patient (1.5%).
11. In our study, 10 patients (15.1%) had no complications on follow up after 2 months. Skin excoriation was the most common complication observed in 54 patients (81.9%); parastomal hernia (n=1, 1.5%), excoriation with prolapse (n=1, 1.5%) were other stomal issues observed.
12. Preoperatively all patients underwent routine investigations. Amongst the 67 patients, the hemoglobin levels ranged from 8.10 to 15.80 g/dl with mean Hb level of 11.53 g/dl. Total leucocyte counts were in the range of 5.0 x 10^3/ul to 24.20x 10^3/ul with mean TLC count of 11.32 x 10^3/ul; Platelet count ranged from 118 to 457 x 10^3/ul with mean count of 229.67 x 10^3/ul. Creatinine levels were in the range of 0.40 to 1.57 mg/dl with mean level of 1.07 mg/dl; sodium levels were in the range of 130 to 148mmol/l with mean level of 137.59mmol/l; potassium levels were in the range of 3 to 4.92mmol/l with mean level of 3.91mmol/l; chloride levels ranged from 90 to 111mmol/l with mean

level of 99.95mmol/l; albumin levels were in the range of 2.80 to 4.20 g/dl with mean level of 3.53 g/dl; bilirubin levels ranged from 0.26 to 1.70mg/dl with mean level of 1.09mg/dl.

Despite the fact that exploratory laparotomy with subsequent ileostomy formation is a frequent surgical procedure done now a days for various abdominal pathologies, there is a scarcity of data on stoma related complications.Our study was aimed to address all those stomal issues. Complications associated with stomas are frequent and range from simple inconvenience to life-threatening situations; even a mild skin problem may be troublesome for the patient and we as caregivers have to take them seriously. In this study most of the complications were managed conservatively and the help of stoma therapist was enlisted whenever required. In conclusion, patient education, enterostomal therapist and a surgical expertise if combined together can have significant role in minimizing the stoma complications and thereby helping the patient to adapt this change in their lives.

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PICTURE 1: SKIN EXCORIATION WITH RETRACTED STOMA

PICTURE 2: SKIN EXCORIATION

PICTURE3: STOMA PROLAPSE WITH PARASTOMAL HERNIA

PICTURE 4: STOMA PROLAPSE

PICTURE 5: RETRACTED STOMA

KEY TO MASTER CHART

COMPLICATIONS

0. None
1. Excoriation
2. Parastomal Infection
3. Necrosis
4. Fixation problems
5. Fistula
6. Stenosis
7. Retracted
8. Parastomal hernia
9. Prolapse
10. Small bowel obstruction
11. High output stoma
12. Bleeding
13. Flush stoma

CO MORBIDITIES

0. None
1. Diabetes mellitus (dm)
2. HTN
3. Tuberculosis
4. Bronchial asthma
5. Hepatitis B
6. Hepatitis C
7. HIV
8. CKD (chronic kidney disease)
9. CAD (Coronary artery disease)

Type of ileostomy

1. Loop ileostomy
2. End ileostomy
3. Double barrel ileostomy

SR NO	NAME	AGE	SEX	CR NO.	PRIMARY ETIOLOGY	COMORBIDITY	BMI	PROCEDURE	ANAESTHESIA	TYPE OF ILEOSTOMY	COMPLICATIONS DURING THE HOSPITAL STAY
1	S	27	FEMALE	838747	TRAUMATIC BOWEL PERFORATION	0	Normal weight(18.5-24.99)	1	GA	1	0
2	R	45	MALE	874926	ENTERIC PERFORATION	1	Overweight(25.0-29.9)	1	GA	1	0
3	G	67	MALE	841099	ENTERIC PERFORATION	1	Overweight(25.0-29.9)	1	GA	1	0
4	B	44	MALE	825486	ENTERIC PERFORATION	0	Overweight(25.0-29.9)	1	GA	1	11
5	B	40	MALE	876729	ENTERIC PERFORATION	1,2	Obese(>30.0)	1	GA	1	11
6	J	86	FEMALE	879491	TUBERCULAR PERFORATION	1,2,9	Overweight(25.0-29.9)	1	GA	2	1
7	S	47	MALE	920911	CARCINOMA COLON	1	Overweight(25.0-29.9)	2	GA	1	0
8	R L	41	MALE	857453	ENTERIC PERFORATION	2	Overweight(25.0-29.9)	1	GA	1	0
9	D	30	FEMALE	887250	TUBERCULAR PERFORATION	0	UNDERWEIGHT(<18.5)	1	GA	1	0
10	K	29	MALE	862970	ENTERIC PERFORATION	0	Obese(>30.0)	1	GA	1	0
11	B	36	MALE	892726	ENTERIC PERFORATION	0	Normal weight(18.5-24.99)	1	GA	1	0
12	P S	24	MALE	981818	TUBERCULAR PERFORATION	0	Normal weight(18.5-24.99)	1	GA	1	0
13	G S	67	MALE	980276	ENTERIC PERFORATION	1	Normal weight(18.5-24.99)	1	GA	1	0
14	K	63	FEMALE	653651	ENTERIC PERFORATION	2	Overweight(25.0-29.9)	2	GA	1	11
15	M	33	MALE	826629	ENTERIC PERFORATION	2	Overweight(25.0-29.9)	1	GA	1	11
16	K	23	MALE	1005823	TUBERCULAR PERFORATION	0	Overweight(25.0-29.9)	1	GA	1	0
17	D R	50	FEMALE	1025368	BOWEL OBSTRUCTION SECONDARY TO ADHESIONS	1	Overweight(25.0-29.9)	2	GA	1	0
18	D	61	MALE	912374	ACUTE COMPLICATED APPENDICITIS	1	Normal weight(18.5-24.99)	1	GA	1	11
19	K	36	FEMALE	895638	ENTERIC PERFORATION	1,2,9	Overweight(25.0-29.9)	1	GA	1	11
20	R	70	MALE	145868	BOWEL OBSTRUCTION SECONDARY TO ADHESIONS	1,2,9	Overweight(25.0-29.9)	1	GA	1	0
21	J D	74	FEMALE	231188	BOWEL OBSTRUCTION SECONDARY TO ADHESIONS	1,2	UNDERWEIGHT(<18.5)	1	GA	3	6
22	S	76	MALE	874143	ENTERIC PERFORATION	1	Overweight(25.0-29.9)	1	GA	1	0
23	P G	17	MALE	921882	ACUTE COMPLICATED APPENDICITIS	0	Overweight(25.0-29.9)	1	GA	1	0
24	S G	23	MALE	1042308	TRAUMATIC BOWEL PERFORATION	0	UNDERWEIGHT(<18.5)	1	GA	1	0
25	S G	42	MALE	893459	TUBERCULAR PERFORATION	0	Normal weight(18.5-24.99)	1	GA	1	0
26	B S	62	MALE	1026459	CARCINOMA COLON	1	Overweight(25.0-29.9)	2	GA	1	0
27	G	69	MALE	742157	ENTERIC PERFORATION	1	Overweight(25.0-29.9)	2	GA	1	1
28	S	27	MALE	883333	TUBERCULAR PERFORATION	0	Normal weight(18.5-24.99)	1	GA	1	0
29	S	38	Female	912799	ENTERIC PERFORATION	0	Overweight(25.0-29.9)	1	GA	1	0
30	G S	16	MALE	1043488	BOWEL OBSTRUCTION SECONDARY TO ADHESIONS	0	UNDERWEIGHT(<18.5)	2	GA	1	0
31	H P S	35	MALE	1010944	ENTERIC PERFORATION	0	Normal weight(18.5-24.99)	1	GA	1	0
32	R S	65	MALE	1043712	CARCINOMA COLON	1	Overweight(25.0-29.9)	1	GA	1	0
33	K	49	MALE	663505	ACUTE COMPLICATED APPENDICITIS	2	Overweight(25.0-29.9)	1	GA	1	0
34	S K	41	FEMALE	923661	ENTERIC PERFORATION	0	Overweight(25.0-29.9)	1	GA	1	0
35	M	40	FEMALE	937202	ENTERIC PERFORATION	1,2	Overweight(25.0-29.9)	1	GA	1	0
36	K	45	FEMALE	42318	ENTERIC PERFORATION	2	Overweight(25.0-29.9)	1	GA	1	11
37	K K	19	MALE	1089773	TUBERCULAR PERFORATION	0	UNDERWEIGHT(<18.5)	1	GA	1	11

SR NO	NAME	COMPLICATIONS ON FOLLOWUP AFTER ONE MONTH	COMPLICATIONS ON FOLLOW UP AFTER TWO MONTHS	PRE OPERATIVE HAEMOGLOBIN	PRE OPERATIVE TOTAL LEUCOCYTE COUNT	PRE OPERATIVE PLATELETS	UREA	CREATNINE	SODIUM	POTASSIUM	CHLORIDE	S.ALBUMIN	S.BILIRUBIN
1	S	0	1	10.3	24.2	206	17	0.4	139	3	109	3.7	
2	R	9	1	9.2	6.6	259	20	1.1	148	3.99	98	3.4	1.1
3	G	0	1	12.8	13.6	230	18	0.7	138	3.84	110	3.8	
4	B	0	1	11	9.8	196	19	0.9	136	3.9	109	3.9	
5	B	0	1	10	14	178	20	1.4	130	3	111	3.7	
6	J	0	8	8.1	5.4	197	55	0.95	144	3.76	110		
7	S	0	1	12.6	6.9	210	59	1.23	137	4	96	3.2	1.1
8	R L	0	1	11	9	166	54	0.98	138	3.88	108	3.9	1.2
9	D	9	1	9.8	11.5	199	51	0.88	139	3.2	99	3	1
10	K	1	1,9	9.4	16.5	418	28	0.63	140	4.03	103	4.09	1.1
11	B	1	1	11.1	7.6	150	23	0.67	143	3.6	111	3.8	
12	P S	1	1	10.7	6.9	143	21	0.99	142	3.9	99	3.78	1.2
13	G S	1	1	11.9	7.4	137	23	1.34	140	4.1	98	3.9	1.1
14	K	1	1	11	9.4	166	10	1.2	134	4.2	98	3.9	1.1
15	M	1	0	10.9	8.4	199	18	1.3	139	3.9	99	4.2	1
16	K	1	1	11	17.9	231	21	1.1	137	4.3	103	3.8	1
17	D R	1	0	12	11.1	289	23	1.3	139	4.2	97	3.9	1.1
18	D	1	1	11.7	12.9	130	28	0.99	140	4.73	104	3.9	0.26
19	K	7	1	12.9	16.9	135	27	0.97	141	3.98	98	3.9	1.2
20	R	0	1	15.8	16.98	129	24	1.5	140	3.67	97	3.2	1.1
21	J D	9	1	11	11.8	129	26	1	133	3.29	98	3.7	1.2
22	S	1	1	9.8	11	139	30	1.2	139	3.8	100	3.9	1.1
23	P G	1	0	9.9	10.8	140	28	1.1	133	3.99	110	3.3	1
24	S G	1	1	10	11.3	138	26	1.2	132	3.87	99	3.2	1
25	S G	1	1	11.3	19.6	133	24	1.2	139	4	104	3.4	1.1
26	B S	1	0	12.3	11	140	23	1.1	137	3.8	99	3.2	1.1
27	G	1	1	11	9.4	138	23	1.3	140	3.7	102	3.3	1.3
28	S	1	1	10.9	9.9	130	22						
29	S	1	1	9.8	9.2	234	21	1.1	142	3.9	98	3.1	1.1
30	G S	1	1	11	13.4	231	27	1.23	139	3.87	97	3.2	1.2
31	H P S	1	0	12.8	11.3	222	24	1.43	130	3.98	98	3.1	1.1
32	R S	9	1	13.4	11.2	457	23	1.32	138	4.3	97	3.12	1
33	K	1	1	11	9.9	220	24	0.88	140	3.87	99	3.4	1.2
34	S K	1	1	9.7	6.6	210	23	0.97	139	3.99	94	3.9	1
35	M	0	1	11	7.2	197	22	0.87	140	3.77	90	3.72	1.1
36	K	0	1	10.8	5.7	325	21	0.77	142	3.68	100	4	1
37	K K	1	1	14.8	10.9	322	22	1.01	139	4.3	103	4	1

SR NO	NAME	AGE	SEX	CR NO.	PRIMARY ETIOLOGY	COMORBIDITY	BMI	PROCEDURE	ANAESTHESIA	TYPE OF ILEOSTOMY	COMPLICATIONS DURING THE HOSPITAL STAY
38	H	39	MALE	749789	ENTERIC PERFORATION	0	Normal weight(18.5-24.99)	1	GA	1	11
39	S	35	MALE	944554	TUBERCULAR PERFORATION	0	Normal weight(18.5-24.99)	1	GA	1	0
40	R R	75	FEMALE	1080767	ENTERIC PERFORATION	1	Overweight(25.0-29.9)	1	GA	3	0
41	J	59	MALE	947498	ENTERIC PERFORATION	1	Overweight(25.0-29.9)	1	GA	2	0
42	H K	34	MALE	1108230	TUBERCULAR PERFORATION	0	Normal weight(18.5-24.99)	1	GA	2	0
43	T R	76	FEMALE	1137659	ENTERIC PERFORATION	2	Overweight(25.0-29.9)	1	GA	1	0
44	S S	43	MALE	1137724	ENTERIC PERFORATION	1,9	Overweight(25.0-29.9)	1	GA	1	0
45	P K	54	FEMALE	1114557	ENTERIC PERFORATION	1	Overweight(25.0-29.9)	1	GA	1	1
46	V G	35	MALE	1100366	ACUTE COMPLICATED APPENDICITIS	2	Overweight(25.0-29.9)	1	GA	1	0
47	S B	46	FEMALE	1102168	TRAUMATIC BOWEL PERFORATION	2	Overweight(25.0-29.9)	1	GA	1	1
48	S S	30	MALE	1121326	TUBERCULAR PERFORATION	0	Normal weight(18.5-24.99)	1	GA	1	1
49	A	28	MALE	1084313	ENTERIC PERFORATION	0	Overweight(25.0-29.9)	1	GA	2	1
50	S M	56	FEMALE	1003513	ENTERIC PERFORATION	1	Normal weight(18.5-24.99)	1	GA	1	0
51	R K	39	MALE	927124	ENTERIC PERFORATION	1	Normal weight(18.5-24.99)	2	GA	1	1
52	S	45	MALE	952806	CARCINOMA COLON	2	Overweight(25.0-29.9)	2	GA	1	1
53	G	62	MALE	956044	ENTERIC PERFORATION	2	Normal weight(18.5-24.99)	1	GA	3	1
54	P	29	FEMALE	548365	TUBERCULAR PERFORATION	0	UNDERWEIGHT(<18.5)	1	GA	1	0
55	V D	16	MALE	967144	ENTERIC PERFORATION	0	Normal weight(18.5-24.99)	1	GA	1	0
56	G S	25	MALE	946531	TUBERCULAR PERFORATION	0	UNDERWEIGHT(<18.5)	1	GA	1	0
57	A L	43	MALE	938738	ENTERIC PERFORATION	2	Obese(>30.0)	1	GA	1	0
58	G	67	MALE	980276	ENTERIC PERFORATION	2	Overweight(25.0-29.9)	1	GA	1	0
59	B K	52	FEMALE	939045	BOWEL OBSTRUCTION SECONDARY TO ADHESIONS	1	Overweight(25.0-29.9)	2	GA	2	11
60	A S	24	MALE	983498	BOWEL OBSTRUCTION SECONDARY TO ADHESIONS	0	Normal weight(18.5-24.99)	1	GA	1	0
61	D S	70	MALE	983959	TRAUMATIC BOWEL PERFORATION	1	Normal weight(18.5-24.99)	1	GA	1	0
62	T S	31	MALE	986526	TRAUMATIC BOWEL PERFORATION	2	Overweight(25.0-29.9)	1	GA	1	0
63	S	22	MALE	987130	TRAUMATIC BOWEL PERFORATION	0	Normal weight(18.5-24.99)	1	GA	1	0
64	K L	42	FEMALE	987403	ENTERIC PERFORATION	0	Overweight(25.0-29.9)	1	GA	1	0
65	N R	40	MALE	960612	ENTERIC PERFORATION	0	Overweight(25.0-29.9)	1	GA	1	0
66	S	35	MALE	944554	TUBERCULAR PERFORATION	0	Normal weight(18.5-24.99)	1	GA	1	0
67	N	14	FEMALE	873642	TUBERCULAR PERFORATION	0	UNDERWEIGHT(<18.5)	1	GA	1	0

SR NO	NAME	COMPLICATIONS ON FOLLOWUP AFTER ONE MONTH	COMPLICATIONS ON FOLLOW UP AFTER TWO MONTHS	PRE OPERATIVE HAEMOGLOBIN	PRE OPERATIVE TOTAL LEUCOCYTE COUNT	PRE OPERATIVE PLATELETS	UREA	CREATNINE	SODIUM	POTASSIUM	CHLORIDE	S.ALBUMIN	S.BILIRUBIN
38	H	1	0	9.4	6.9	318	20	0.98	137	4.5	110	3.5	1
39	S	1	1	13.8	8.3	328	21	1.23	139	3.9	97	3.8	0.89
40	R R	9	1	15.3	13.9	299	24	1.1	138	3.87	99	3.22	0.9
41	J	1	1	14.5	15.7	445	25	0.98	140	3.6	99	3.9	0.98
42	H K	1	1	14.9	14	333	23	1	134	3.4	96	3.2	1.1
43	T R	0	1	13.3	13	321	22	1	137	3.7	99	3.8	1
44	S S	1	0	13.3	12	333	25	1.3	137	4.2	110	2.9	1
45	P K	0	1	12	11.2	432	22	1.1	136	3.8	99	3.1	1.2
46	V G	1	1	14.9	12.4	211	21	1.3	137	3.7	98	2.8	1
47	S B	1	1	14	13.87	190	20	1.57	139	4.3	97	3.88	1
48	S S	0	1	11	17.8	213	24	1.22	137	3.98	99	3.78	1
49	A	1	0	12.4	18.9	432	21	1.1	145	4.2	101	4	1
50	S M	1	0	11	12.9	231	24	0.98	134	4.1	96	3	1.5
51	R K	0	1	12.3	9.2	217	25	0.8	139	4.92	104	3.9	1
52	S	1	1	11	8.9	198	21	0.9	137	4	110	3.2	1.3
53	G	9		10	7.8	118	20	0.98	136	3	98	3.1	1.7
54	P	0	1	11	7.4	190	21	0.88	134	4.5	92	3.2	1.1
55	V D	1	1	10	5	245	21	0.76	138	4.2	98	3.1	1.1
56	G S	1	1	9.8	6.9	210	20	0.88	138	4.1	97	3.5	1.2
57	A L	1	0	12	18.5	199	20	1.44	130	3.9	93	3.7	1.1
58	G	1	0	11	9.8	200	20	1.34	132	3.9	92	3.88	1.4
59	B K	9	1	12	8.9	215	18	1.11	140	3.7	90	3.45	1.33
60	A S	1	1	11	9.9	234	24	1	139	3.9	98	3.8	1
61	D S	1	0	11	10	299	22	1.12	140	3.6	99	3	1
62	T S	1	1	12	14	200	21	0.99	137	3.4	97	3.2	1
63	S	1	0	11	12	198	17	1.1	134	3.9	98	3.2	1
64	K L	1	1	12	11.9	298	25	1	134	3.88	97	3.4	1.4
65	N R	1	0	11	11	287	23	1.11	132	4.44	98	3.9	1.1
66	S	1	0	10.8	12	277	22	0.99	133	4.1	97	3.3	1
67	N	9	1	11	11	244	23	0.88	132	3.8	94	3.2	1.1

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Subject: **Approval of Plan of Thesis.**

This is to inform you that the Faculty of Medical Sciences in its meeting held on 22.01.2021 has approved the plan of thesis of **Dr. Prateek Janagal**, a student of your college for **MS General Surgery** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis
To study postoperative complications following ileostomy

Supervisor
Dr. Amandeep Singh Nar
Assoc. Prof.,
Dept. of Surgery,
DMCH, Ludhiana.

Co-Supervisor
Dr. Atul Mishra
Prof.,
Dept. of Surgery,
DMCH, Ludhiana.

The student has to submit the three copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

1. ***If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.***
2. *The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.*

TO STUDY POSTOPERATIVE COMPLICATIONS FOLLOWING ILEOSTOMY

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

M.S.

In

Surgery

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES
FARIDKOT

NOVEMBER, 2019

DR. PRATEEK JANAGAL

DEPARTMENT OF SURGERY
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA

ABSTRACT OF PLAN OF THESIS

Title	TO STUDY POSTOPERATIVE COMPLICATIONS FOLLOWING ILEOSTOMY
For the degree of	M.S. General Surgery
Name of the candidate	Dr Prateek Janagal
Supervisor	Dr. Amandeep Singh Nar, Associate Professor, Department of Surgery, DMCH, Ludhiana
Co-supervisor	Dr. Atul Mishra, Professor, Department of Surgery, DMCH, Ludhiana
Institution	Dayanand Medical College & Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction: The word "Stoma" comes from the Greek word meaning mouth or opening. The most common abdominal stomas are the ileostomy and colostomy. Ileostomy is used to divert the fecal stream away from distal bowel in order to allow a distal anastomosis to heal as well as to relieve obstruction. It may be temporary or permanent. Though a life saving procedure, it may result in significant number of complications. Ileostomy complications can significantly affect patients' quality of life and sense of well-being while burdening the health care system. Complications are divided into early (up to 30 days after operation) and late (after 30 days of operation). It is critical for the surgeon to possess a thorough understanding of ileostomy complications and treatment. Detail oriented attention at the time of ileostomy creation, especially in case of permanent ileostomy, can help minimize the morbidity associated with this procedure.

Aim of Study: To study cases with complications following ileostomy.

Methods: Patients with Ileostomy complications in the department of Surgery, Dayanand medical college and hospital, Ludhiana over a period of 1 ½ years, will be studied and analysed statistically.

Clinical Significance: The construction of an intestinal stoma is fraught with complications and should not be considered a trivial undertaking. Serious complications requiring immediate reoperations can occur, as can minor problems that will subject the patient to daily and nightly distress. Intestinal stomas undoubtedly will dramatically change lifestyles; patients will experience physiologic and psychologic detriment with stoma-related problems, however minor they may seem. Surgeons should be vigilant of these complications before, during, and after stoma creation, and adequate measures should be taken to avoid them.

Keywords: Stoma, malformations, hernias , enterostomal therapy.

(Signature)	(Signature)	(Signature)	(Signature)
Candidate	Co-supervisor	Supervisor	Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"TO STUDY POSTOPERATIVE COMPLICATIONS FOLLOWING ILEOSTOMY"** exist in the Department of Surgery, DMC&H, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis is genuine and is collected by the candidate herself under our supervision and guidance.

Supervisor

Dr. Amandeep Singh Nar
Associate Professor
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Co-Supervisor

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Head of the Department

Dr. Jaspal Singh
Professor & Head
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Place: DMC Ludhiana

Date: 16/12/19

APPROVAL PROFORMA
BY RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

Name of candidate	Dr. Prateek Janagal
Department	Surgery
Topic of Thesis	TO STUDY POSTOPERATIVE COMPLICATIONS FOLLOWING ILEOSTOMY
Likely date of appearing in PG examination	MAY 2022
Date of enrollment	May, 2019
Name of Head of Department	Dr. Jaspal Singh
1) Supervisor **2) Co-Supervisor**	Dr. Amandeep Singh Nar Dr. Atul Mishra
Signature of Members of Research Committee with Stamp	**Signature of Members of Ethics Committee with Stamp**
Dr. Jaspal Singh (Professor & Head, Surgery)	Mr. A K Jindal (Member, Ethics Committee)
Dr. Dinesh Gupta (Professor & Head, Medicine)	Dr. Anu Sharma (Professor, Anatomy)
Dr. Sandeep Kaushal (Assistant Dean Academics)	Dr. Deepinder K Chhina (Professor & Head, Microbiology)
Dr. Rajoo Singh Chhina (Dean Academics)	Dr. Neena Sood (Professor & Head, Pathology)
Dr. Gurpreet S Wander (Vice Principal)	Dr. Gurpreet S Wander (Vice Principal)
	Dr. Gagandeep Singh (Secretary, Ethics Committee Professor & Head, Neurology)

Approved: Yes / ~~No~~

Dr. Sandeep Puri
Chairperson
Research Committee

Chairperson
Research Committee

Approved: Yes / ~~No~~

Prof. Arvind Malhotra
Chairperson
Ethics Committee

Chairperson
Ethics Committee

BABA FARID UNIVERSITY OF HEALTH SCIENCES, FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	Dr. PRATEEK JANAGAL
2	NAME OF THE INSTITUTE	DAYANAND MEDICAL COLLEGE AND HOSPITAL , LUDHIANA
3	COURSE OF STUDY AND SUBJECT	MS GENERAL SURGERY
4	DATE OF ADMISSION OF COURSE	MAY , 2019
5	TITLE OF THE TOPIC	TO STUDY POSTOPERATIVE COMPLICATIONS FOLLOWING ILEOSTOMY

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Fecal diversion remains an effective option to treat a variety of gastrointestinal and abdominal conditions.[1] An intestinal stoma is an opening of the intestine on anterior abdominal wall made surgically.[2]

Ileostomy formation can be permanent or temporary, and elective or part of emergent operations. When created properly, can dramatically improve a patient's quality of life. Patients with a good functioning ileostomy can expect to live a normal life with very few lifestyle restrictions. In contrast, when a patient develops complications related to their stoma, the impact on their physical and mental health can be irreparable. Various Indications for which intestinal stomas are formed: bowel obstructioncongenital bowel defects, injury to the intestinal tract, inflammatory bowel disease, ischemic bowel disease, spinal cord injury and much more. The associated morbidity and overall function of a ileostomyis dependent upon the indication for the ileostomy, whether it was created electively or emergently, and patient factors such as body mass index, whether patient is diabetic(is a risk factor for high rate of complications),smoker and prior surgery. Unfortunately, significant morbidity is associated with ileostomy creation. The literature reports the rate of stoma-related complications ranging from 20 to 70%.[3-6] Early complications occur within the first 30 days of the stoma creation and include ischemia/necrosis, retraction, mucocutaneous separation, and parastomal abscess. Late complications include parastomal hernia, prolapse and retraction. Disease, patient, clinical, and stoma-specific factors influence the outcomes pertaining to their creation. Stoma complications can significantly affect patients' quality of life and sense of well-being while burdening the health care system. It is critical for the surgeon to possess a thorough understanding of stoma complications and treatment. Detail-oriented attention at the time of stoma creation, especially in case of permanent stomas, can help minimize the morbidity associated with this procedure.

6.2 REVIEW OF LITERATURE

The Bible described about stoma. When Eglon was stabbed by Ethud: "He (Eglon) could not draw the dagger out of his belly and dirt came out". In 350 BC Praxagoras of Kos has a kind of stoma created by intestinal injuries. Hippocrates (460-377BC), Cornelius (53BC-AD7), Galen (131-201AD) knew injuries to the colon and small intestine were often fatal, but did not know what to do. The word "Stoma" comes from the Greek word meaning mouth or opening. Fecal diversion by stoma formation remains an effective option to treat a variety of gastrointestinal and abdominal conditions. These days creation of an ileostomy is a common procedure performed by surgeons as part of the treatment for both benign and malignant conditions. Ileostomy formation can be permanent or temporary, and elective or part of emergent operations Often this part of the surgery is performed at the conclusion of a complex and challenging operation. The rate of complications following ileostomy creation is not insignificant, and care must be taken to adhere to sound surgical technique during this part of the operation. Complications associated with ileostomy can be minor, requiring only local care and enterostomal therapy (ET)—or can be devastating, leading to multiple reoperations and significant morbidity.[7,8] Not just the health related issues but psychological weight of the stoma on patient body image and quality of life (QOL) can't be overlooked. There are conflicting results in determining whether an ileostomy has more impact on the QOL on the patient [9,10], however, the mere presence of any stoma has a sizable impact on patient's lifestyle.[11] In general, postoperative stomal complications are a relatively frequent source of morbidity. Various risk factors that predispose a patient to develop stoma related complications include age, gender, body mass index (BMI), nutritional status, American Society of Anesthesiologists (ASA) status, corticosteroid use, emergency versus elective surgery, location and type of ileostomy as well as the type of disease for which ileostomy is formed. Early complications occur within the first 30 days of the stoma creation and include ischemia/necrosis, retraction, mucocutaneous separation, and parastomal abscess. Late complications include parastomal hernia, prolapse, retraction, and varices. Harris et al found the most common stoma-related complications in 345 ostomates were herniation, retraction, necrosis, infection,

prolapse, stenosis, fistula, and small bowel obstruction (SBO).[12] The authors also found that loop ileostomy had the highest complication rate out of all stoma configurations. Postoperative stoma necrosis was strongly and significantly associated with emergency stoma creation. In the recent literature with long-term follow-up, Nastro et al reported a major complication rate of 46.4%; when minor parastomal skin problems are included, the rate increases to 56%.[13] Minor parastomal skin problems were often coexistent with major complications (33.9%). Parmar et al identified that, short stoma length, body mass index > 30, emergency surgery, and lack of preoperative marking were associated with increased risks of complications. Parmar et al noted a complication rate of 27.1% among 192 patients. In this study also colostomies had a greater rate of early complications when compared with ileostomies (31.7 % vs. 18.3%) in this study.[7] Some of the most common stoma related complications are :

Parastomal Hernias - Parastomal hernias are incisional hernias at ostomy sites. Parastomal hernia incidence varies with stoma type and configuration (1.8–28.3% for end ileostomies and 0–6.2% for loop ileostomies, and 4–48% for end colostomies and 0– 30.8% for loop colostomy).[14,15] Management includes (1) local repair (direct suture repair), (2) stomal relocation, and (3) prosthetic repair (parastomalhernial repair with mesh).

Stomal prolapse - Stoma prolapse is full-thickness protrusion of bowel through a stoma that occurs in 3% of ileostomies, 2% of colostomies, and 1% of urostomies.[16] Management of Acute stoma prolapse is reduction at the bedside with the aid of sugar and ice to reduce bowel wall edema, allowing for an elective repair if prolapse was to recur. Surgical options for stoma prolapse repair include reversal of a temporary stoma (if possible and feasible), resection, revision, or relocation.[5] The prolapsed bowel segment, which tends to be the distal (efferent) limb, is returned to the abdominal cavity or matured as a mucus fistula.[17-19]

Stoma necrosis- Stoma necrosis is an early postoperative complication resulting from inadequate stomal blood supply. Stoma necrosis is most commonly associated with colostomies, emergent opera- tions, and obesity.[20]

Parastomal varices- Parastomalvarices form in patients with portal hypertension with portosystemic collateralization (stoma -peristomal skin). Inflammatory bowel disease (IBD) with concomitant primary sclerosing cholangitis is the most common setting in which stoma varices occur.[21] The most effective means of reducing portal pressures is transjugular intrahepatic porto- systemic shunt (TIPS) or liver transplantation.[22-23] Other complications include pyoderma gangrenosum ,necrosis and ischemia, stomal retraction and stenosis, dehydration / electrolyte imbalance , mucocutaneous separation etc. From above discussion it is clear that stoma complications can significantly affect patients' quality of life and sense of well-being while burdening the health care system. The potential for serious complications requiring reoperation or persistent daily patient distress long after the initial operation should not be underestimated. Studying the incidence and severity of ostomy complications and the factors that lead to the development of such complications contributes new scientific knowledge and provides a foundation upon which better procedures and methods of prevention of such complications can be developed. Analysing this kind of data helps in prevention and also helps in developing interventions that will improve quality of life for individuals living with an ostomy.

Retraction-An ileostomy is defined as retracted if the lumen of the stomais below the skin level. Previous necrosis, tension of thebowel, and a too large opening in the abdominal wall maylead to early retraction. Abnormal scarring at stoma site, anincrease of abdominal wall thickness, and obesity may causelate retraction. A local abscess up to abdominal sepsis candevelop after retraction and therefore early recognition may offerthe chance for a nonoperative management. Subcuticularserosalsuture may be used to re-anchor the ileostomy andprevent a wider surgical procedure. Surgical revisionis indicated if complete retraction with separation of the entiremucocutaneous junction occurs.

Peristomal Infection- Usually it is related to intraoperative contamination of the abdominal wall and granulomas from unabsorbable sutures (stitch sinus). It alsomay occur because of leakage or fistula formation. Emergency setting and laparotomy wound infection favor a postoperative parastomal infection.Antibiotic therapy and conservative management with appropriate

medicated filling may lead to complete healing but surgical revision is recommended if the patient shows any sign of incoming sepsis. A "sutureless" techniqueor delayed opening of the stoma may reduce the incidence of infectious complications.

High-Output Stoma- Any ileostomy discharge volume more than 1500 mL in 24 hours should be considered a high volume output and thus hospital admission should be counseled since it can be complicated by severe dehydration and sepsis. It occurs in 1.7 to 20% of cases.[24,25] Patients need to empty the appliance frequently and may rapidly progress to the metabolic complications of short bowel syndrome. Oral hypotonic fluid restriction antimotility agents, and oral electrolyte replacementare indicated until the stoma output is reduced.

6.3 AIMS AND OBJECTIVES OF THE STUDY

To study postoperative complications following ileostomy

7. MATERIALS AND METHODS

Cases with Ileostomy related complications in the department of Surgery, Dayanand medical college and hospital, Ludhiana over a period of 1 ½ years, will be studied and analysed statistically.

7.1 Source of Data

The study will be conducted on patients with ileostomy admitted to the "Department of Surgery, DMC Hospital, Ludhiana" during the period JANUARY 2020 – JUNE 2021

7.2 METHOD OF COLLECTION OF DATA

INCLUSION CRITERIA-

1. All Patients were checked for various complications post ileostomy formation during their hospital stay and at the follow ups till the stoma closure
2. Patient undergoing ileostomy as emergency or elective procedure in the department of surgery

EXCLUSION CRITERIA-

1 Patients with stoma other than ileostomy

Duration of study: 1 ½ years

OUTCOME

To study various complications encounterred in patients undergoing ileostomy.

STATISTICAL ANALYSIS

Data will be described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. All statistical calculations will be done using SPSS (Statistical Package for the Social Science) SPSS 21 version statistical program for Microsoft Windows

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

Not Applicable.

7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

Attached herewith

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PROFORMA

SR. NO.

1. NAME:

2. Age/Sex:

3. C R No:

4. Admission No: **5.DoA:** **6.DoD:**

7. Address

8 History-

Diabetes:

Smoking:

BMI (BODY MASS INDEX):

9 Primary Etiology:

10 PROCEDURE: ELECTIVE/EMERGENCY

11. General Physical Examination:

Pulse Resp rate BP Temp

Weight Build

12. Systemic examination:

Chest CVSCNS

P/A -

Stoma Site-

Signature of Candidate **Signature of Supervisor**

Type of stoma -

1. Loop
2. End
3. Double barrel

Complications

- Excoriation
- Redness
- ParastomalInfection
- Necrosis
- Leakage
- Fistula
- Stenosis
- Retracted
- Parastomal hernia
- Prolapse
- Small bowel obstruction
- High output stoma

13. Investigations:-

HMG- HB- Platelets-

TLC-

RFT: - Urea Creatinine

Sodium Potassium

Chloride

Signature of Candidate **Signature of Supervisor**

LFT: - S BILIRUBIN T/D-

: SGOT-

ALP-

TOTAL PROTEINS-

SGPT-

ALP-

S. ALBUMIN-

A/G RATIO

13. Any other investigations:

14. Remarks:-

Signature of Candidate

Signature of Supervisor

INFORMED PATIENT CONSENT

Date: _____

I.....D/o, W/o, S/o.....

am willing to participate in the study **"TO STUDY POSTOPERATIVE COMPLICATIONS FOLLOWING ILEOSTOMY"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

.....
Signature of the Witness

Name:

.....
Signature of the patient

Signature of Candidate

Signature of Supervisor

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____ निवासी _____ इस शोधकार्य **"TO STUDY POSTOPERATIVE COMPLICATIONS FOLLOWING ILEOSTOMY"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____
गवाह के हस्ताक्षर
नाम:

_____
रोगी के हस्ताक्षर/अंगूठे का निशान
नाम:

_____
अन्वेषक के हस्ताक्षर

_____
विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

"TO STUDY POSTOPERATIVE COMPLICATIONS FOLLOWING ILEOSTOMY" ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

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ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ

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ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____

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ਪਤਾ _____

ਪਤਾ _____

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ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

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ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ